AUGUST 1954

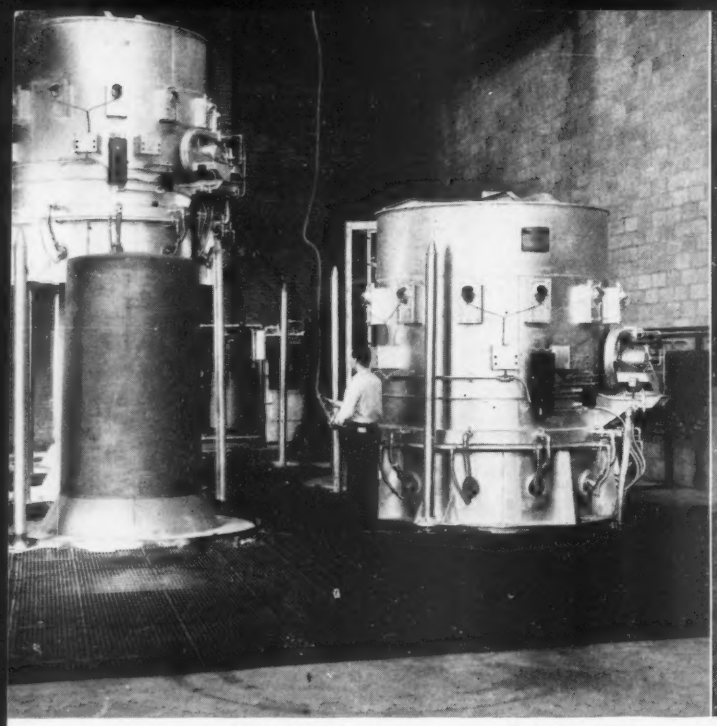
WIRE AND WIRE PRODUCTS

Shooting for TOP MONEY?

Have a Morgan engineer — the real "pro" of the wire drawing industry — help you decide the best approach to increased production.

MORGAN CONSTRUCTION CO. WORCESTER, MASSACHUSETTS WM-86

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION



Part of the Lee Wilson Annealing Installation at the Lamson & Sessions Co., Cleveland Bolt Plant.

High Speed Cold Heading Bolts Requires Controlled Rod Spheroidizing

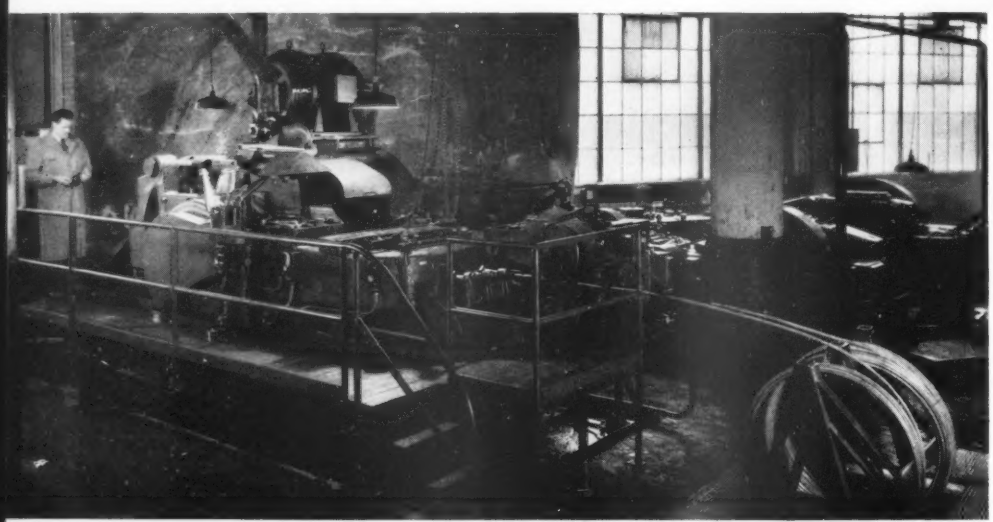
he automatic screw and bolt machines that cold forge thousands f pieces every hour are necessarily expensive and complicated. Vire or rod is fed from a coil directly into the machine and, perating faster than the eye can follow, the machine cuts the laterial to length, cold heads it, points and threads it with xacting precision.

is important that the wire or rod be uniformly spheroidized rior to entering the machine. By altering the structure of the teel so the carbides are held in spheroidal grains, forcing the netal into shape is accomplished with far greater ease than if he grain structure retains the "needle-like" shape after hot olling.

The ability of the Lee Wilson wire and rod annealing furnaces to produce a constantly uniform spheroidized anneal at minimum cost is the big reason why today more wire and rod are processed in Lee Wilson furnaces than in any other type.

The Lee Wilson installation pictured on this page is that of The Lamson & Sessions Co., one of the world's leading producers of cold forged fasteners.

Lee Wilson

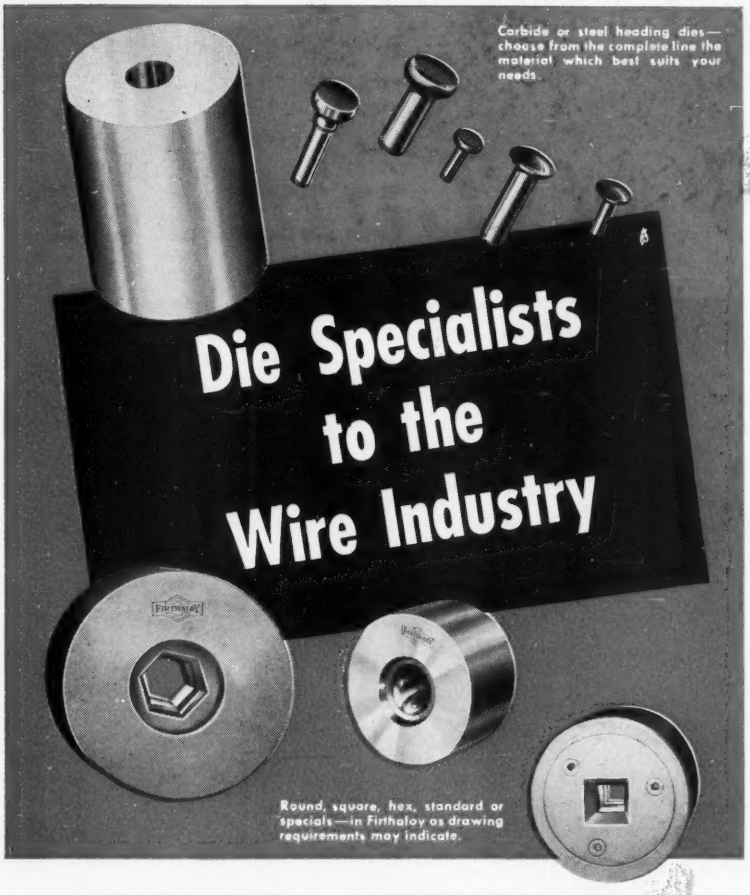


(Above) Six steps in cold forging bolt performed by the Automatic Bolt Machine.

◀ (Left) Automatic Bolt Machines conve into finished bolts.

Lee Wilson Engineering Company • Inc.

20005 West Lake Road • Cleveland 16, Ohio


Carbide or steel heading dies—choose from the complete line the material which best suits your needs.
Die Specialists to the Wire Industry
Round, square, hex, standard or specials—in Firthaloy as drawing requirements may indicate.

A COMPLETE LINE...CARBIDE AND STEEL

• Firth Sterling offers wire manufacturers and fabricators the advantages of a *single* source of supply of materials for both tungsten carbide and tool steel for drawing, shaping, forming and heading dies. This *complete* line, from famous Firthaloy, for maximum performance where carbide is a requirement, through almost one hundred grades of high speed and tool steels for header dies, hammer punches, inserts, cut-off knives, roll guides, die casings, forming rolls and similar applications, saves you time and money.

Firth Sterling representatives are skilled in interpreting the needs of the wire industry and in suggesting the exactly right steel or carbide for specific applications. Because they know and sell both, you can depend on their unbiased recommendations to result in better, more economical tooling.

Attention: Fastener Industry! C.H.Q. Die Steel makes cold heading records

C.H.Q. solid die after 192,000 run.

A nationally known fastener manufacturer* recently made comparative tests of solid steel cold heading dies, under carefully controlled conditions, producing ⅝" square head machine bolts from 1020 steel on a Waterbury Farrel double stroke automatic.

Firth Sterling C.H.Q. came off with top honors and the highest production ever obtained by this manufacturer from any steel die . . . 192,045 both ends. (78,860 one end, 59 Rockwell C; 113,185 other end, 61 Rockwell C.) Standard competitive carbon steel dies produced only 50,000-60,000 both ends and ultimately failed by cracking axially. The C.H.Q. die wore oversize but longitudinally etched section revealed not even a hairline crack.

Ask for technical literature on C.H.Q.—or a Firth Sterling representative will discuss your die problems.

*(name on request)

R-299

Firth Sterling

—INC—

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

OFFICES AND WAREHOUSES*: BIRMINGHAM CHICAGO* CLEVELAND DAYTON DETROIT* HARTFORD* HOUSTON LOS ANGELES* NEW YORK PHILADELPHIA PITTSBURGH WASHINGTON WESTFIELD, N.J

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels
Tool & Die Steels
Stainless Specialties
High Temperature Alloys
Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets
Zirconium

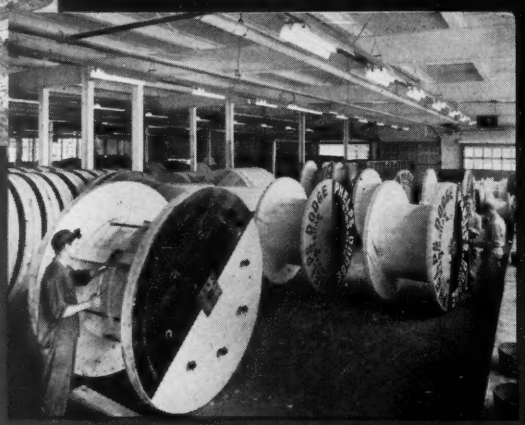
not just a stock, but . . .

ACRES of Lumber

GUARANTEES

PROMPT
REEL
DELIVERY

WOOD REELS
for
CABLE · ROPE · WIRE
made to your
SPECIFICATIONS



A large reserve of LUMBER plus BRIDGE'S unique PRODUCTION methods makes it possible to fill ORDERS without DELAY.

HIGH SPEED

SHIPPING SERVICE in our . . . OWN TRUCKS

within a radius of 200 miles from the plant. Fast freight will bring you Bridge reels in 5 days or less east of the Mississippi.

BRIDGE
MANUFACTURING COMPANY
HAZARDVILLE, CONNECTICUT

Telephone . . .
Thompsonville, Connecticut
RIverview 9-8308

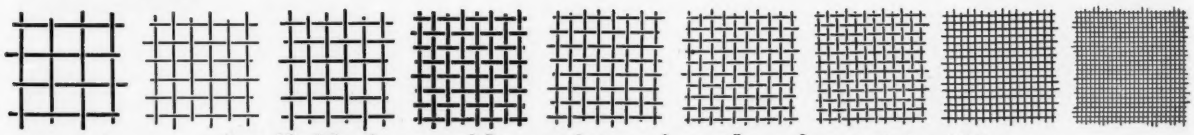
"REAL GOOD . . .

Let us quote on your reel needs. Send your specifications. Better yet, visit our plant and see how and why our reels are made so well at so low a cost.

WOOD REELS"

This is one greatly magnified opening...

This opening of Chase Industrial Wire Cloth is magnified to show you that the mesh is completely square. So is every *other* opening in the mesh. Why the exactness? Because no wire cloth can do its best job unless its openings have—and *hold*—the same exact dimensions. That is why *each and every wire* in Chase wire cloth is *double*-crimped. Next time, insist on Chase Brass and Copper Industrial Wire Cloth.



Available in a wide variety of meshes from 2 to 100.

Chase ®

BRASS & COPPER CO.

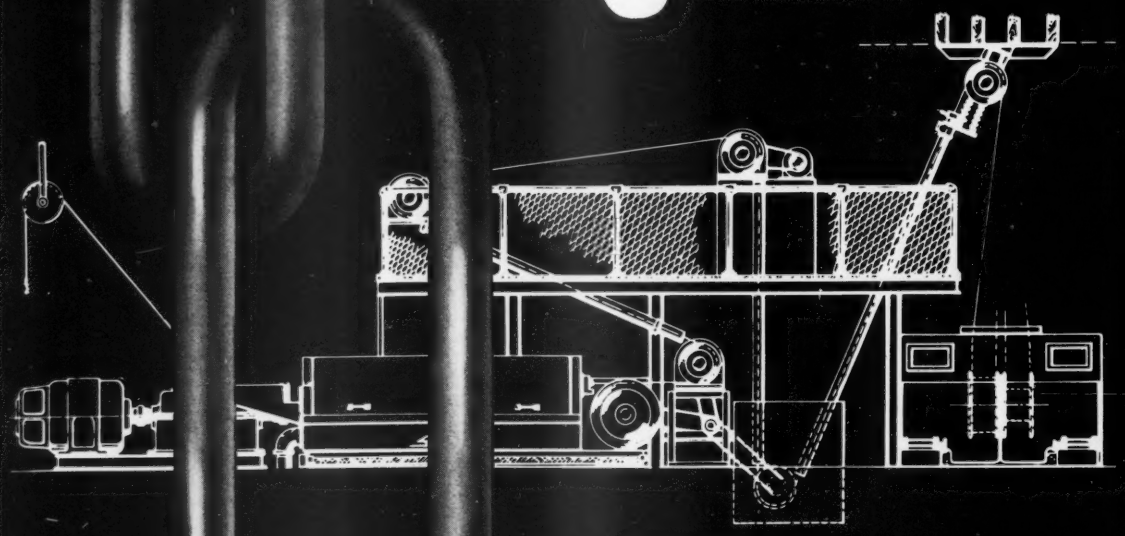
WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

NEW PRIZE-WINNING MOVIE—*"The Science of Making Brass."* Available for free showing in your plant or office, or to industry groups. Call nearest Chase warehouse or write us.

The Nation's Headquarters for Brass & Copper

Albany†	Chicago	Denver†	Kansas City, Mo.	Newark	Pittsburgh	San Francisco
Atlanta	Cincinnati	Detroit	Los Angeles	New Orleans	Providence	Seattle
Baltimore	Cleveland	Houston	Milwaukee	New York	Rochester†	Waterbury
Boston	Dallas	Indianapolis	Minneapolis	Philadelphia	St. Louis	(†sales office only)

• LECTR O NEALING and...
■ REEL O MATIC spooling



A BIG LINK

in the chain of WIRE MILL operations

NOW it's possible to DRAW, ANNEAL and SPOOL copper wire in a continuous HIGH SPEED operation.

IN ADDITION to producing high quality wire . . . you can also save a considerable amount of TIME and MONEY.

TAKE advantage of this revolutionary development. WE would be very pleased to acquaint you with complete DETAILS.

SYNCRO®

MACHINE COMPANY

PERTH AMBOY · NEW JERSEY · USA

• ELECTRIC RESISTANCE ANNEALING
■ AUTOMATIC (NON-STOP) SPOOLING

WIRE DRAWING MACHINES · STRANDERS · DIE STRINGERS · CONTINUOUS ELECTRIC ANNEALERS · CAPSTANS · WIRE INSULATORS · HEAVY DUTY TAKE-UPS · TAPERS

Better Machinery for the Wire Industry

AFFILIATED COMPANY,
WINGET-SYNCRO, LTD.
ROCHESTER, KENT, ENGLAND

WIRE AND WIRE PRODUCTS*

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 29 AUGUST, 1954 No. 8

Designated as Official Publication By The Wire Association

Contents

Editor's Desk 841

The Importance of Lime in Wire Drawing
by Thomas C. Miller 843

Quality—A Combination of Horsesense and Statistical Methods
by C. Kenneth Hamlin 852

Wire Flattening—An Appraisal of Today's Theory and Practice—Part I
by A. I. Nussbaum 857

Natural Aging of Neoprene Jacketed Telephone Drop Wire
by R. H. Dudley and C. A. Larson 860

Successful Regional Meeting Held in California 863

The Impact of Changes In Defense Spending On Southern California Industry
by Dr. Louis B. Perry 865

The Program of The Annual Convention of The Wire Association 870-873

Outstanding Personalities of the Wire Industry 881

A Review of Recent Wire Patents 889

Index to Advertisers 924

Where-to-Buy 925-928

WIRE and WIRE PRODUCTS is indexed regularly by Engineering Index, Inc., New York, N. Y.

RICHARD E. BROWN, President and Publisher

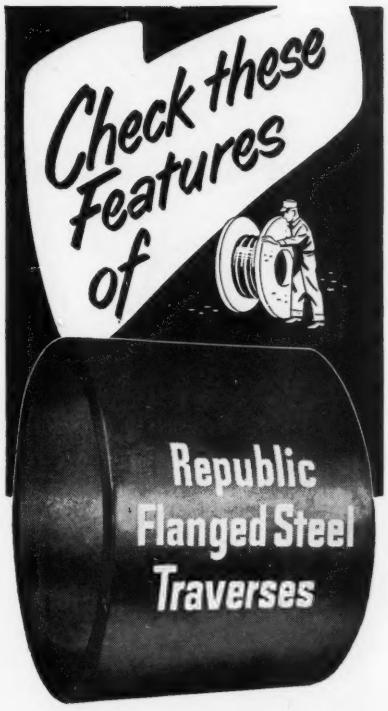
R. S. Spengel, Secy.-Treas. & Gen'l. Manager
J. Edward Donnellan, Vice-President

Edmund D. Sickels, Editor

— ASSOCIATE EDITORS —
Lancaster, Allwine & Rommel, Consultants on Patent Information

Publication Office: Jersey City, N. J.
Executive Office: 453 Main St., Stamford, Conn.
*Reg. U. S. Pat. Off.

WIRE & WIRE PRODUCTS, Vol. 29, No. 8, August, 1954. Publication Office at One Sherman Avenue, Jersey City, N. J. Executive Office 453 Main Street, Stamford, Conn. Published monthly by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Sec'y and Treas. Subscription Price: U. S. $8.00; Canada, $8.00 per year; Domestic 75 cents per copy; Foreign 90 cents per copy, except October Convention Issue and January Proceedings Issue, $1.25 per copy; Foreign $10.50 per year. Entered as second class matter at the Post Office, Jersey City, N. J. under the act of March 3, 1879. Copyright, 1954 Quinn-Brown Publishing Corp.
Scott Printing Company, Jersey City 7, New Jersey



1. Light Weight

2. High Strength

3. Top Durability

4. Easy to Assemble

5. Smooth Galvanized Surface—no rough spots to damage plastic-covered cable

● Made in sizes up to 56-inch diameter and 48-inch traverse—in plain, painted or hot dip galvanized finish—as light as 18-gauge steel. Width of flange and number of bolt and drain holes furnished to your specifications. Available for prompt delivery. Write for prices.

* * *

Manufactured under license arrangement with Western Electric Co., Inc.

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
Pressed Steel Division • Niles, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Dept.: Chrysler Building, New York 17, New York

SLICKEST TUBE DRAW COMPOUND YET!

For steel, brass, copper...

SHELL CALMA COMPOUND K, a new product of Shell Research, is the economical answer to trouble-free tube drawing in both plug-draws and die-sink operations on steel, copper, brass and aluminum tubing. It remains stable for long periods in high bulk temperature operations.

Calma K gives off no noxious odor or fumes in either neat form or in the emulsion . . . perfectly safe for handling under all plant conditions. It's easy to use. It requires no boiling or cooking . . . simply mix it with hot water from the tap and it's ready for use.

Write on your letterhead for a one-pound sample for your own evaluation.

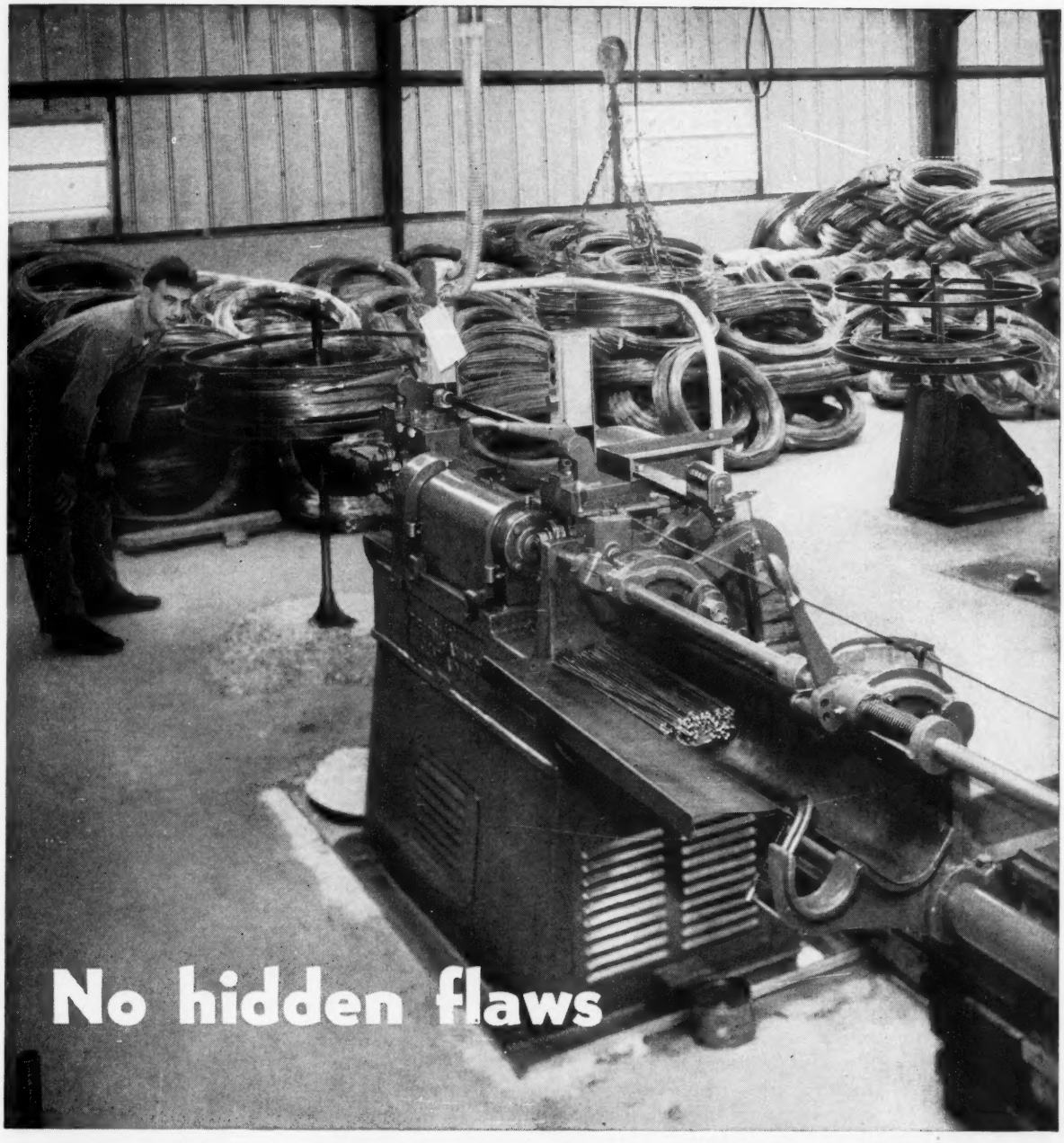
CHECK ITS ODOR.. CHECK ITS LUBRICITY... CHECK ITS VERSATILITY

SHELL Calma Compound K

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL



Youngstown

QUALITY V YOUNGSTOWN SERVICE

BRIGHT BASIC WIRE

●No matter how much your machines may bend or crimp or bite Youngstown Wire, its superior qualities pay off in better wire products. Reasons: Youngstown Wire is uniform in diameter—has no injurious imperfections—is rigidly inspected to insure the exact ductility and other qualities you want. Call our nearest District Sales Office for prices and delivery dates.

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

NEW! HIGH POTENTIAL Insulation Breakdown Tester

• mobile • tests to 50,000 volts • capacities to 25KVA

RELIABLY DETECTS INSULATION FAILURES — The DAVIS Hi-Pot Tester cuts off high voltage at predetermined current flow. It automatically and positively identifies insulation breakdowns and prevents damage to tested equipment. For cable, wire and other insulation requiring ratings: 2 KVA 0-2,000 volts; 2 KVA 0-3,000 volts; 5 KVA 0-5,000 volts; 7½ KVA 0-7,000 volts; 15 KVA 0-15,000 volts.

PORTABLE — A handsome, streamlined, wrinkle-finished steel cabinet only 29" high, 23" wide, and 18" deep, houses this entire mobile tester which rolls quietly on puncture-proof rubber tires.

ECONOMICAL — A low center of gravity and large push-bar handle make a well balanced tester which can be easily moved wherever needed. Ideal for production budgets not permitting more than one unit.

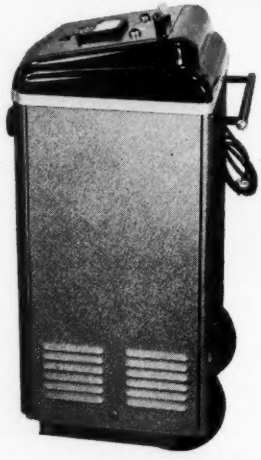
SIMPLE TO OPERATE — Red light registers insulation breakdown. Green light indicates insulation O.K. Little or no maintenance over long usage. Ease of operation permits use of relatively unskilled help. Operates from 110 V, 220 V, 440 V, 50/60 cycles or any standard AC power line.

OFFERS MAXIMUM SAFETY — Designed to A.I.E.E. specifications, this ruggedly built DAVIS High Potential Insulation Tester provides laboratory testing accuracy for most industrial and railroad conditions. A magnetic safety switch breaks the circuit on breakdowns or overloads. The entire instrument case is maintained at ground potential. Test leads are heavily insulated and shielded to ground. Test probe handles are of thick dielectric strength material, with flash guards that prevent arc or flash burns and operator hand slippage.

BURN TESTS — Automatically creates a continuous arc at voltage and current sufficient to maintain the burn, thus precisely locating breakdown.

PLUS FEATURES — *Voltage control* is stepless continuously variable over complete output voltage range. *Voltage indicator* is easy to read, shows output voltage across test leads. Available in all standard and special KVA testers.

For full details, WRITE TO-DAY for Bulletin HPT.



Davis ELECTRIC CO.

WALLINGFORD, CONN., U.S.A.

DAVIS WIRE & CABLE EQUIPMENT

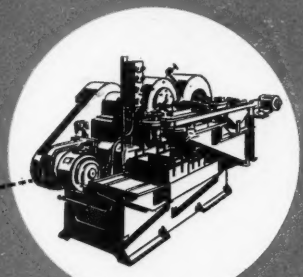
HARNESS TESTERS ★ PAY-OFFS ★ TRAVERSES

SPARK TESTERS ★ SPOOLERS ★ TAKE-UPS ★ CAPSTANS

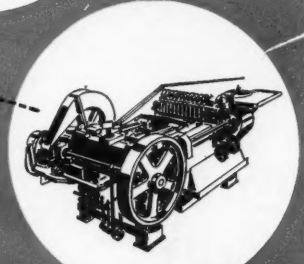
Correspondents throughout the world

Foreign Sales Representatives: OMNI PRODUCTS CORP. 460 — 4th Avenue, New York 16, New York

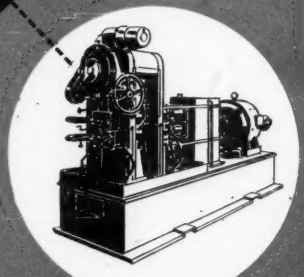
5 KINDS OF WATERBURY FARREL ANSWERS TO YOUR MASS PRODUCTION PROBLEMS



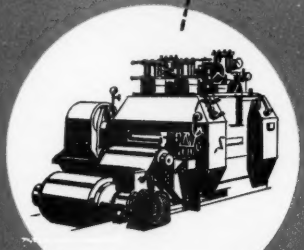
COLD PROCESS BOLT & NUT MACHINERY — Headers (all types) • Rivet Machinery • Trimmers • Thread Rolling Machines • Slotters • Nut Formers and Tappers, etc.



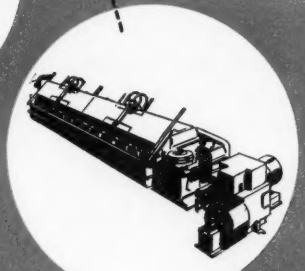
POWER PRESSES—Crank, Cam and Toggle; also Rack and Pinion Presses • Eyelet Machines • Multiple Plunger Presses • Horizontal and Hydraulic Presses, etc.



MILL MACHINERY — Rolling Mills: Strip, Rod, Wire Flattening, (For Ferrous and Non Ferrous Metals) • Also Slitters • Straighteners • Cut-off Saws • Coilers • Winders, etc.



SPECIAL MACHINERY — Sendzimir Mills • Small Arm Ammunition Machines • Collapsible Tube Machines • Coining Mills, etc.



WIRE MILL EQUIPMENT — Continuous Wire Drawing Machines (Upright Cone and Tandem) • Wire Flattening Mills • Chain Draw Benches • Pointers • Swagers • Bull Blocks • Strand-up • Machines • Spoolers, etc.

Within These Basic WF Equipment Lines, Individual Machines Are Custom-Engineered For Specific Applications

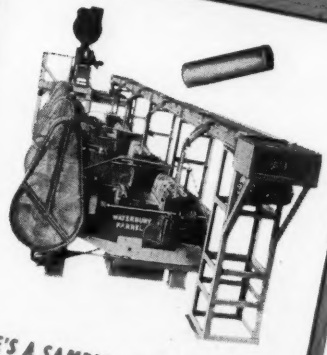
If your metal-working machinery problem falls into any of these five groups, there are good reasons for looking to Waterbury Farrel for the answer.

There's Waterbury Farrel's continuing engineering research with more than a century of machine building experience to draw upon. This results in soundly designed and thoroughly tested features which improve production.

There's Waterbury Farrel's world-wide reputation for rugged, long-lasting construction. This gives you the assurance that WF machines are built to provide long years of uninterrupted production.

Waterbury Farrel can custom-engineer special equipment or adapt a standard machine to fit your specific problem.

For further information, write for free booklets on any of the machines mentioned on this page or contact your nearest WF office.



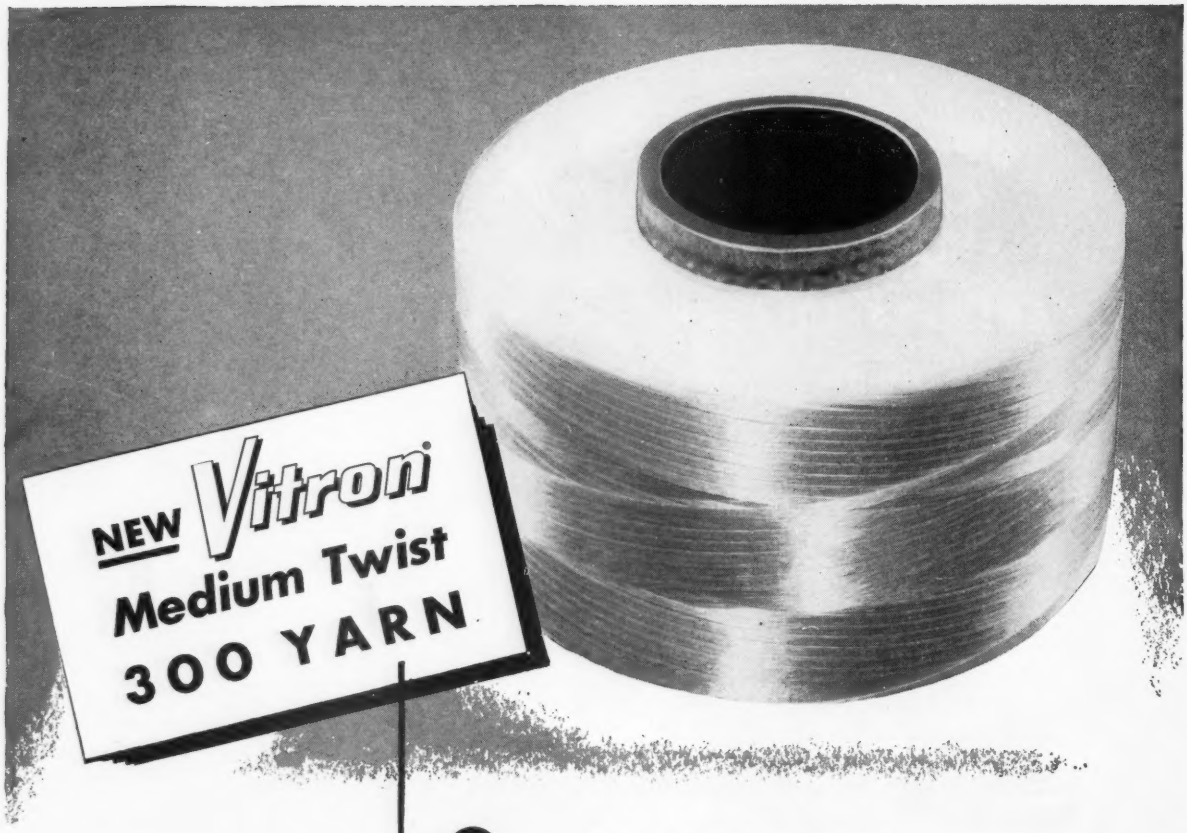
HERE'S A SAMPLE of Waterbury-Farrel mass production equipment in action. This complete WF automatic production unit combines a 40-ton double-acting, upright blanking and cupping press, a conveyor feed and four 7-station horizontal drawing presses to draw 340 zinc shells per minute.

FOUNDED WATERBURY FARREL 1851

WATERBURY FARREL FOUNDRY & MACHINE CO. • WATERBURY, CONN.

Offices: Chicago, Cleveland and Millburn, N. J.

WF-7



OFFERS 3 IMPORTANT ADVANTAGES

Also a New 150 Yarn

This new 150 yarn with 300 filaments gives you a very smooth wire, with minimum fuzzing, thus reducing scrap. The finer, more flexible filaments make a yarn which is more abrasion resistant, which bends readily without breaking.

1 Control of spread and build

New medium twist permits more flexibility and better control of spread and build.

2 Inventory reduction

Each of these medium twist packages will do a wide variety of jobs and thus cut yarn inventory as much as one third.

3 Smooth, uniform wire—minimum fuzzing

Tests show that this medium twist yarn reduces fuzzing to a minimum, resulting in a smooth finish.

THE SECRET IS UNIFORMITY

The advantages offered by this new medium twist 300 yarn are directly attributable to uniformity: uniformity of the yarn itself, and uniformity both in size and quality of the package. And for that the credit must go to the Electronic-Extrusion process, which produces glass filaments of consistently uniform diameter. *No other maker of glass fibers uses this process.*

For information and samples, write to Glass Fibers Inc., 1810 Madison Avenue, Toledo 2, Ohio.

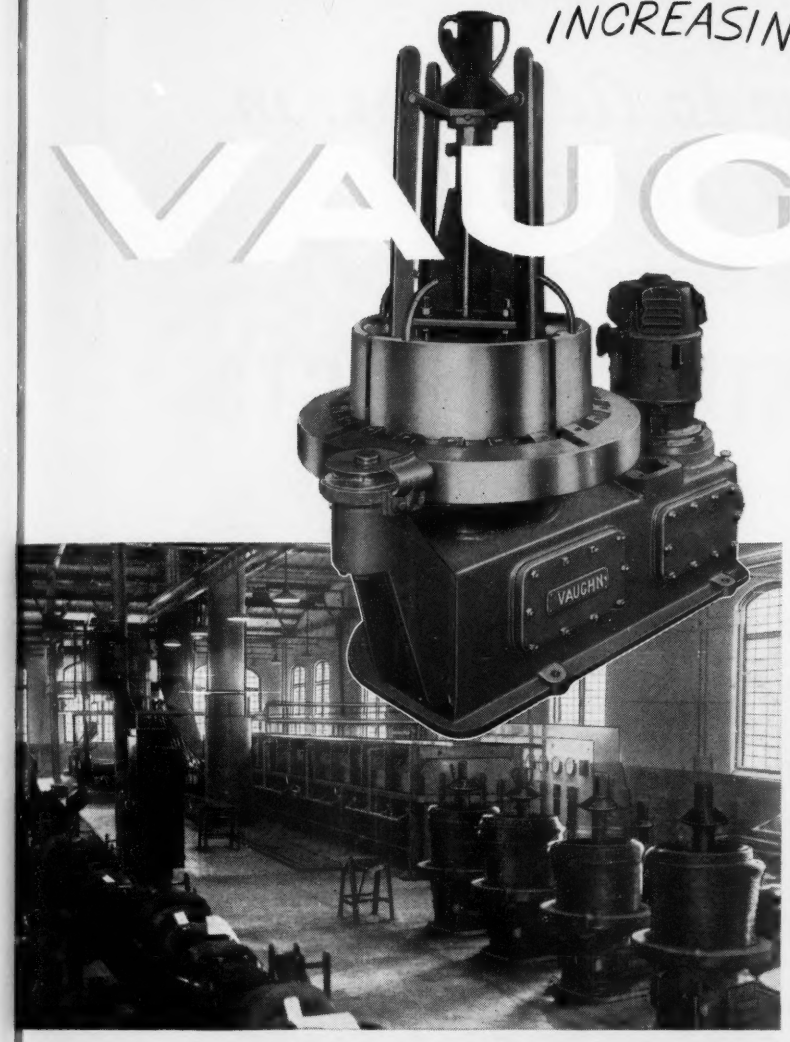
GLASS FIBERS *INC.*

Makers of glass fibers by the ELECTRONIC-EXTRUSION process ... developed, patented and used exclusively by Glass Fibers Inc.

VITRON Yarns • Rovings • Micro-Fibers • **DURAMAT** Vapor Barriers **BLUE FLAG** Pipe Wrap • **MICROLITE** Thermal and Acoustical Insulation • **VIBRAGLASS** Mounting and Packaging Materials **COUSTIC-AIRE** and **THERMO-JET** Aircraft Insulations

THE MODERN METHOD OF INCREASING SIZE OF BUNDLE

VAUGHN®



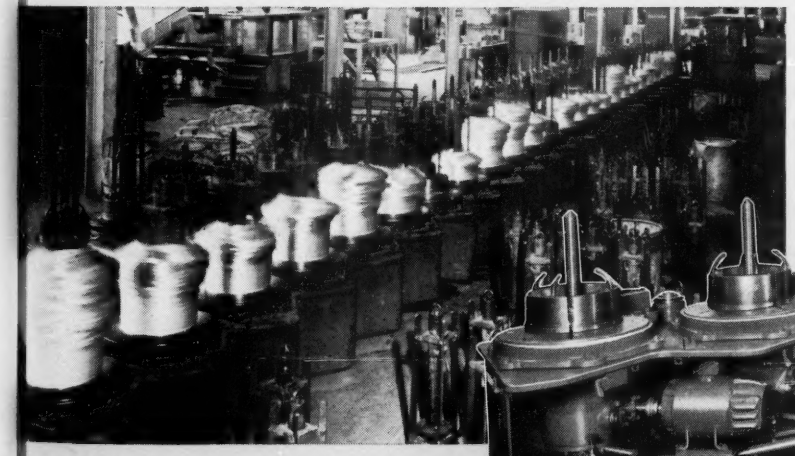
TAKE-UP UNITS

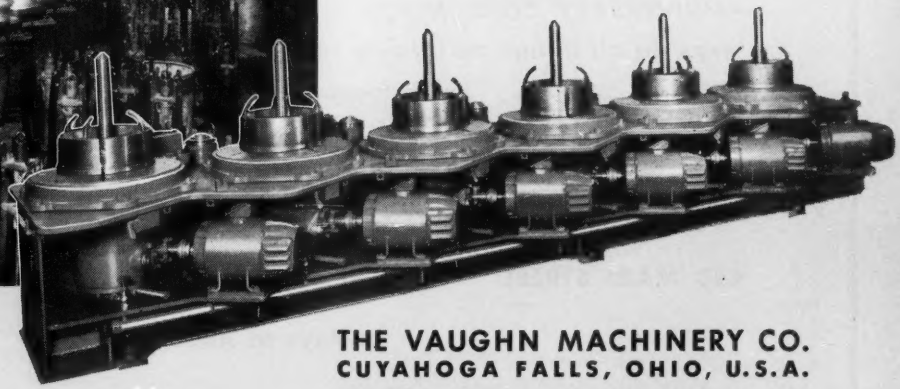
FOR PATENTING AND GALVANIZING

Note these Features!

1. **Individual motor drive—with slow down feature for stripping.**
2. **Push up blocks.**
3. **High riding stripping spider provides a pay-off stand for subsequent processing, and**
4. **automatically reduces pay-off tangles and handling costs.**
5. **Heavier weight bundles mean decreased labor cost.**

Let us discuss these Vaughn advantages with you!





"Quick on the Draw!"®

THE VAUGHN MACHINERY CO.
CUYAHOGA FALLS, OHIO, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars & Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

Prepare Now to Advertise in

THE SILVER ANNIVERSARY

Special October Convention Issue of

WIRE AND WIRE PRODUCTS

In this epochal "special," to be wholly devoted to the Annual Convention of The Wire Association, there will be many added values to justify your being suitably represented with special advertising. It is an opportunity to identify your company as an integral part of this great industry. Join with others to make this coming Convention an outstanding success in the celebration of The Association's 25th birthday.

You are offered exceptionally high reader-interest in the October issue, plus added circulation and longer than average life of the issue. For advertisers, it is value packed. Help to make this a memorable occasion.

The Wire Association will meet in Detroit in 1954, from Nov. 8th through the 11th, at the Statler Hotel. It will feature technical sessions, plant inspection trips, the Annual Luncheon and the Smoker-Dinner.

The issue contains pre-prints of the technical papers to be presented at the Convention and the final program of events. Anything and everything bearing on the Silver Anniversary Convention is included.

WHO SHOULD ADVERTISE? Any producer and seller of rods, wire, or machinery, equipment and supplies sold to the wire industry. If you are selling these products, put your best foot forward in the OCTOBER SILVER ANNIVERSARY CONVENTION ISSUE and cash in on the extraordinary interest in all things pertaining to wire at this time.

ADVERTISING RATES SENT UPON REQUEST

WIRE AND WIRE PRODUCTS

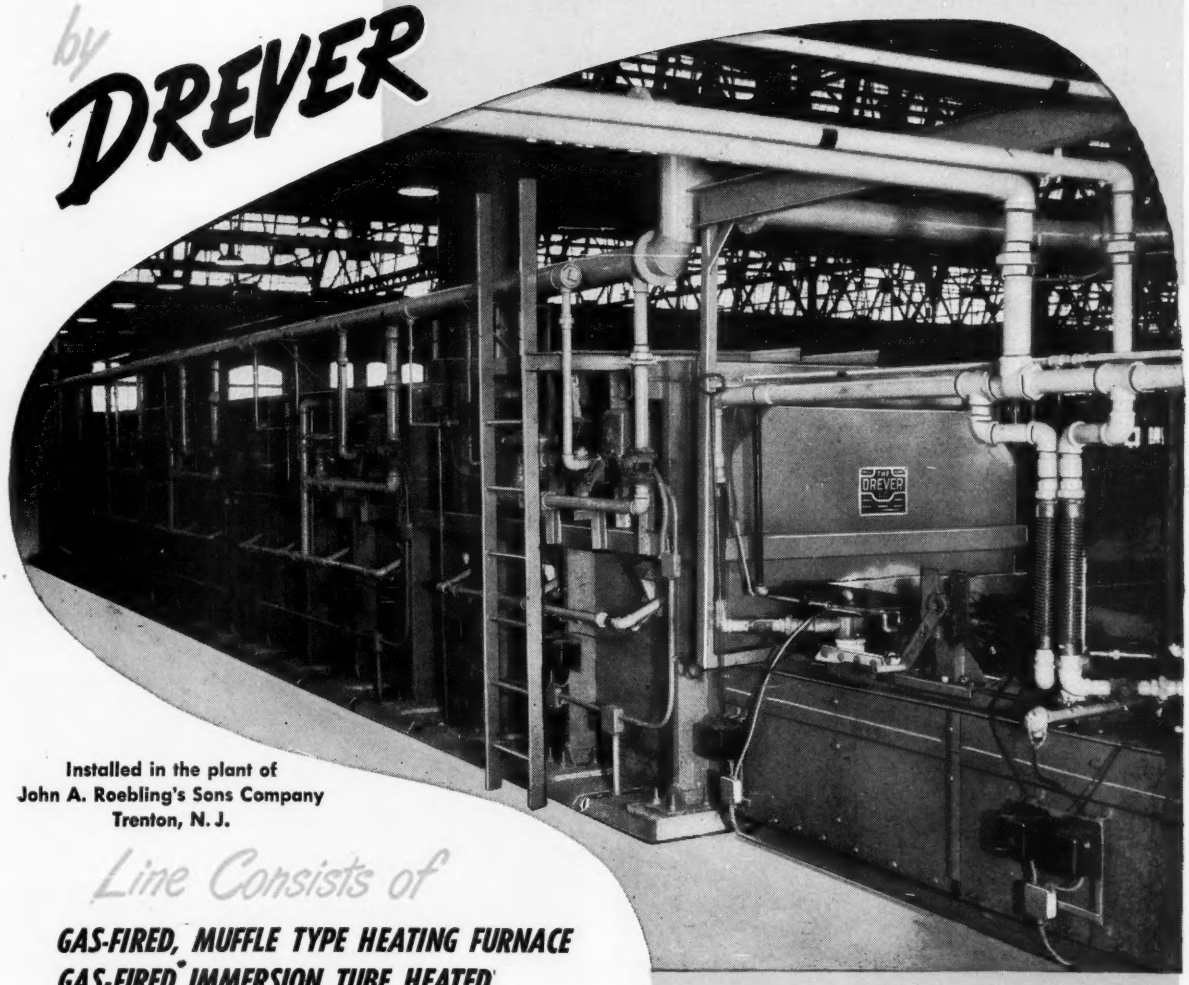
J. EDWARD DONNELLAN, *Vice President*

453 MAIN STREET **STAMFORD, CONN.**

"It Pays to Advertise"

CONTINUOUS WIRE PATENTING, PICKLING AND COATING LINE

by DREVER



Installed in the plant of
John A. Roebling's Sons Company
Trenton, N. J.

Line Consists of

GAS-FIRED, MUFFLE TYPE HEATING FURNACE
GAS-FIRED IMMERSION TUBE HEATED LEAD QUENCHING BATH
COOLING ROLLS
ACID PICKLE TANK
HOT WATER SPRAY RINSE TANK
COATING TANK

CAPACITY, 3000 LBS./HOUR
HIGH CARBON STEEL WIRE
12 STRANDS 0.112" AVERAGE DIA.

Automatic Controls • Can be Electrically Heated
Substantial Savings in Labor Costs
High Quality Products

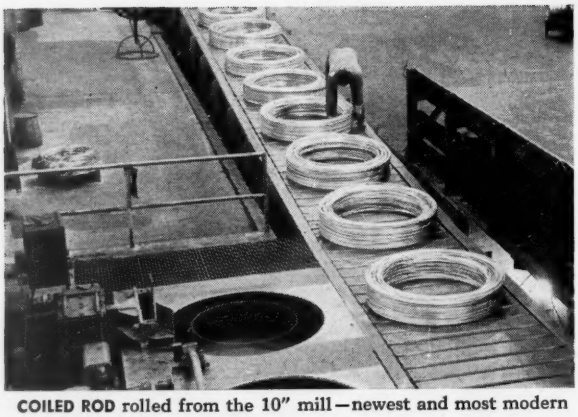
Send your inquiries and requirements for equipment to our competent staff of engineers and metallurgists

DREVER COMPANY

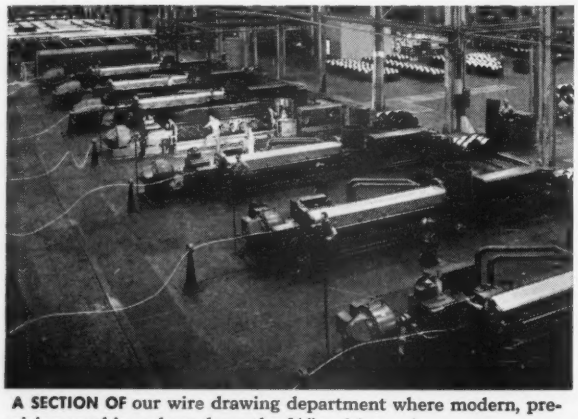
740 E. VENANGO STREET • PHILADELPHIA 34, PA.

QUALITY

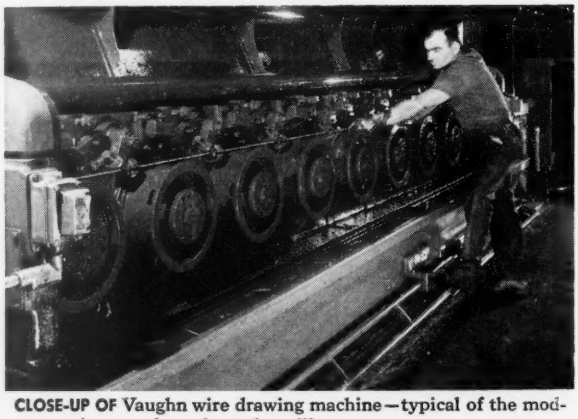
At centrally-located Newark, Ohio, Kaiser Aluminum operates one of the best-equipped high production mills in the nation, producing highest quality wire to meet your specifications. Illustrated here are a few of the reasons for this high quality.



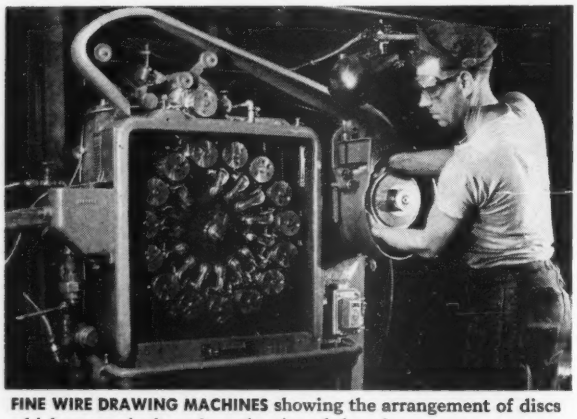
COILED ROD rolled from the 10" mill—newest and most modern mill of its kind in the country.



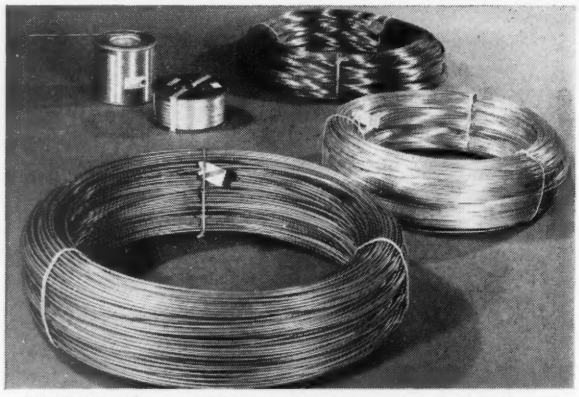
A SECTION OF our wire drawing department where modern, precision machines draw down the ⅜" rod into wire.



CLOSE-UP OF Vaughn wire drawing machine—typical of the modern equipment throughout the mill.



FINE WIRE DRAWING MACHINES showing the arrangement of discs which successively reduce the size of the wire.



RESULT OF modern machinery and expert personnel—quality wire that meets your exact specifications.

OUR WIRE FOR FABRICATORS OF WIRE PRODUCTS includes, round drawn wire, manufacturers' wire, hexagonal wire, rivet wire, welding wire, spooled fine wire, screen wire, and EC wire—in alloys, diameters and tempers to meet your exact specifications.

In addition, we produce redraw rod and redraw wire for further drawing by wire mills into finished products.

For immediate attention to your needs, contact any Kaiser Aluminum sales office listed in your telephone directory, or one of our many distributors. Kaiser Aluminum & Chemical Sales, Inc. *General Sales Office,* Palmolive Bldg., Chicago 11, Illinois; *Executive Office,* Kaiser Bldg., Oakland 12, California.

Kaiser Aluminum

setting the pace—in growth, quality and service

The NEW Coulter & McKenzie PAYOFFPAKAGER

MODEL 128

Look! No Hands!

One continuous 600 pound strand* automatically packaged!

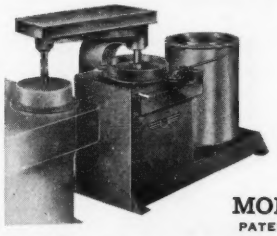
INDIVIDUALLY POWERED UNITS

Direct Packaging of continuous strand material is performed rapidly with the new Coulter & McKenzie Model 128. It is adaptable also for single-die reduction, tinning take-up, and respooling. Applicable to the following materials:

Copper	Stranded Material	Alloy Steel
Brass	Plastic	Aluminum
Insulated Wire	Low Carbon Steel	Tubing
Fine Wire	High Carbon Steel	Coarse Wire
Magnet Wire	Multiple Strand	Rivet Wire

SPEEDS to suit all materials and operations.
POWER to pour the finest strand or reduce and package the coarsest material.

LOW COST ADAPTERS FOR EXISTING BLOCKS



MODEL 126
PATENT PENDING

Write for engineering questionnaire. Models available for vertical or horizontal block conversion.

Other machines are available for continuously drawing and packaging fine and coarse wire.

*Steel Wire.

Continental Can Company Licensee

771 WATER STREET
OPPOSITE RAILROAD STATION

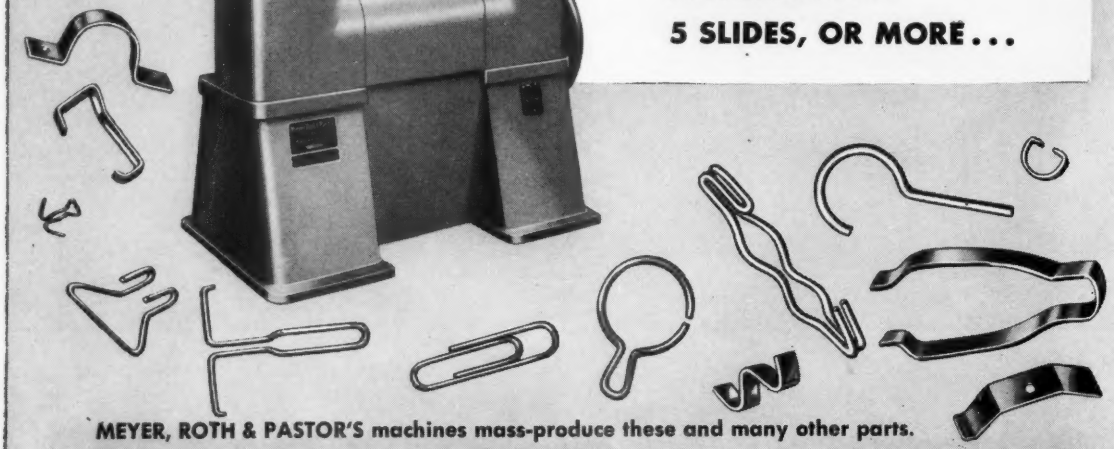
TELEPHONE 5-1101

THE COULTER & McKENZIE MACHINE CO., INC.
BRIDGEPORT 2 CONNECTICUT U. S. A.

HOW VERSATILE CAN YOU GET?

P-L-E-N-T-Y... with
MEYER, ROTH & PASTOR'S
WIRE AND STRIP
FORMING MACHINE

UNIVERSAL...
AUTOMATIC...
5 SLIDES, OR MORE...



MEYER, ROTH & PASTOR'S machines mass-produce these and many other parts.

- 5 different size machines for fully automatic, economical production of parts from wire coil or strip stock.
- Various sizes produce from 60 to 300 pieces per minute in wire up to .145" diameter or strips up to 25/32" wide.
- Simplified tooling—machine can be quickly re-set to produce different parts.
- Vertical design takes up little floor space.
- Positive and direct control of the bending slides insures high output and trouble-free operation.
- Roller straightening attachment (7 vertical and 7 horizontal rollers) can be opened—you can feed material without disturbing the roller setting.
- Special gripping device insures uniform feed and does not mark wires or strips.
- 3-speed drive.
- Standard equipment includes 4 forming and 1 punching slide and a complete set of tooling. Additional forming slides and attachments, including a blanking and punching attachment, can be supplied.

WRITE FOR BULLETIN

COSA — *nationwide sales and service of precision machine tools —from bench lathes to boring mills.*

COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.

finer dies faster for the wire industry with...

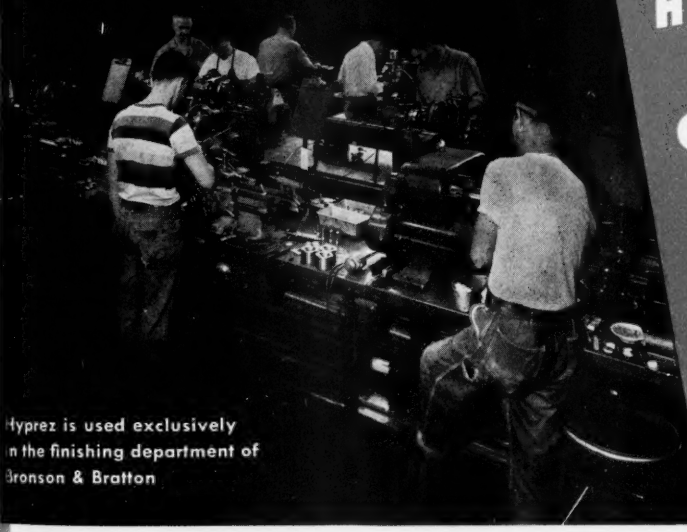
Hyprez used for flawless die finish at modern Chicago plant of Bronson & Bratton, a leading supplier of tungsten-carbide products for the wire industry

HYPREZ

High Precision DIAMOND COMPOUNDS

For economy of muscle, time and cost, Bronson & Bratton, Inc., Chicago, and scores of other die manufacturers and users, demand Hyprez, the original Diamond Compound.

Hyprez is engineered to highest standards of performance: diamond particles of exact grading and concentration; a vehicle assuring permanent suspension; integral color identification; maximum finishing action . . . A complete range of grades, from coarsest to finest.



Hyprez is used exclusively in the finishing department of Bronson & Bratton

Ask for a free demonstration or technical bulletin No. W-854

HYPREZ DIVISION

ENGIS EQUIPMENT COMPANY, CHICAGO 5, ILL.

431 SOUTH DEARBORN ST.

if you need stainless wire — call CRUCIBLE for quick delivery

For any diameter from the smallest to half an inch or more . . . in any temper from dead soft to full hard . . . with a bright surface, or with one of many metallic or nonmetallic finishes — yes, for *any* stainless steel wire, call Crucible.

Crucible's modern stainless steel wire mill is the last word in up-to-date production facilities. What's more, this is combined with the very finest metallurgical and quality control setup you can find anywhere. It means, for you, that every coil . . . every length . . . *every inch* of Crucible stainless steel wire can be produced to the most rigid standards of quality — that Crucible stainless wire conforms to precise standards of uniformity that are unsurpassed in the industry.

So, whatever your requirements for stainless wire — cold heading . . . free machining . . . spring . . . rope . . . weaving . . . armature binding . . . slide forming — Crucible's fine new mill is ready to serve you promptly with wire products of the very highest quality. Call your nearest Crucible warehouse for prompt delivery.

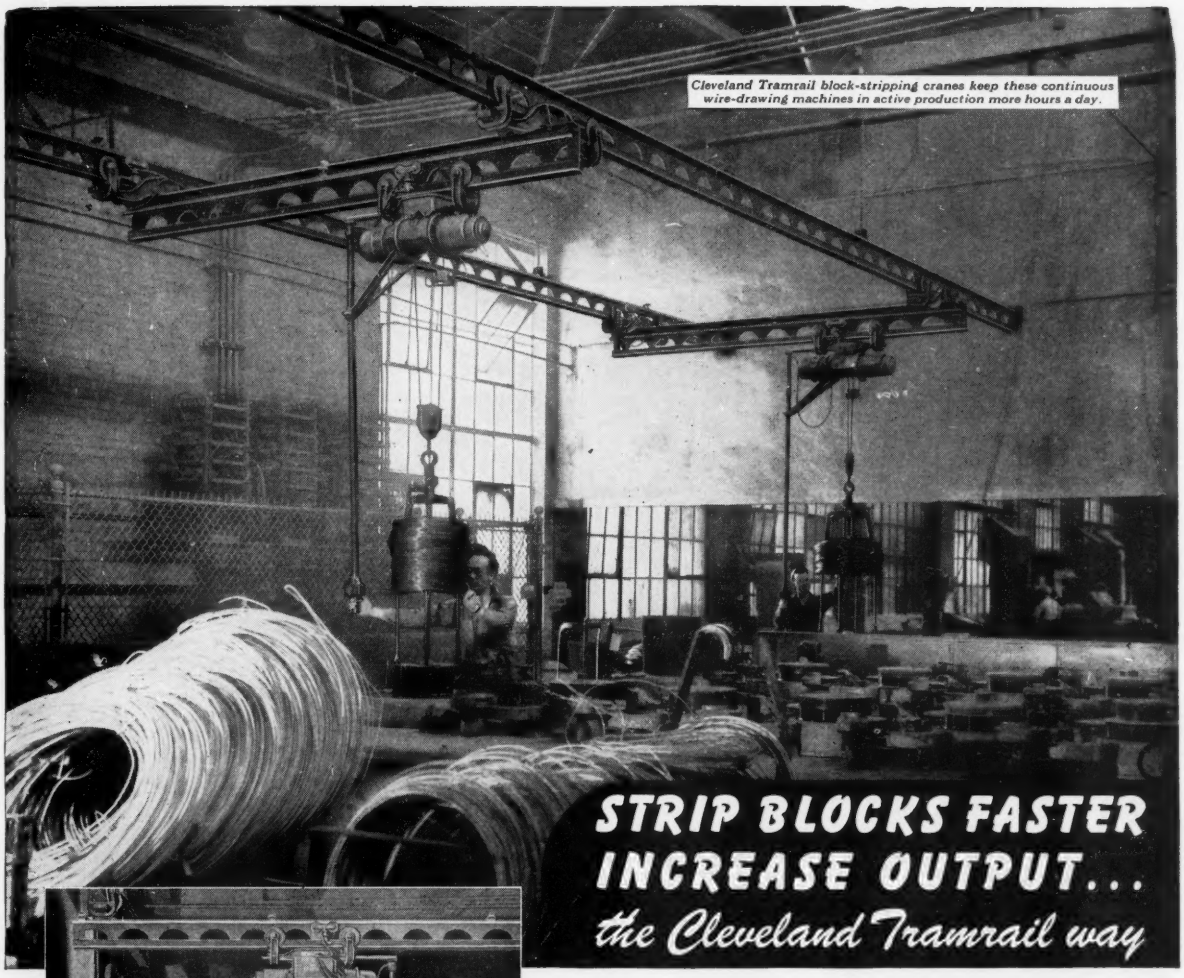
CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **STAINLESS STEEL WIRE**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • MAX-EL • ALLOY • SPECIAL PURPOSE STEELS

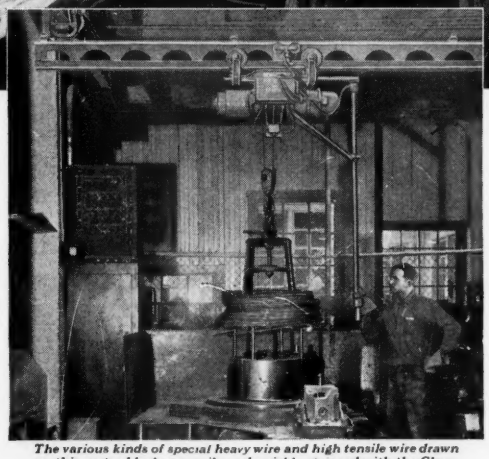
Canadian Distributor — Railway & Power Engineering Corp., Ltd.



Cleveland Tramrail block-stripping cranes keep these continuous wire-drawing machines in active production more hours a day.

STRIP BLOCKS FASTER INCREASE OUTPUT...

the Cleveland Tramrail way



The various kinds of special heavy wire and high tensile wire drawn on this motor block are easily and quickly stripped with the Cleveland Tramrail crane.

Many mills in the United States and Canada have installations of Cleveland Tramrail block-stripping cranes and carriers. They are stripping draw blocks faster and keeping them in operation more hours a day, thus stepping up output.

Smooth rolling Cleveland Tramrail equipment has been especially designed for this service. It allows a man to take care of more blocks and draw heavier bundles. Older experienced men can usually keep pace with younger fellows when this equipment is provided.

The equipment consists of a hand-propelled crane or carrier with an electric hoist. The crane or carrier is easily pushed on its ball-bearing wheels by means of the rigid arm attached to the carrier. Push buttons, conveniently located in the handle at the lower end of the arm, control the hoist.

Cleveland Tramrail overhead materials handling equipment has been developed to serve every department in rod and wire mills.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

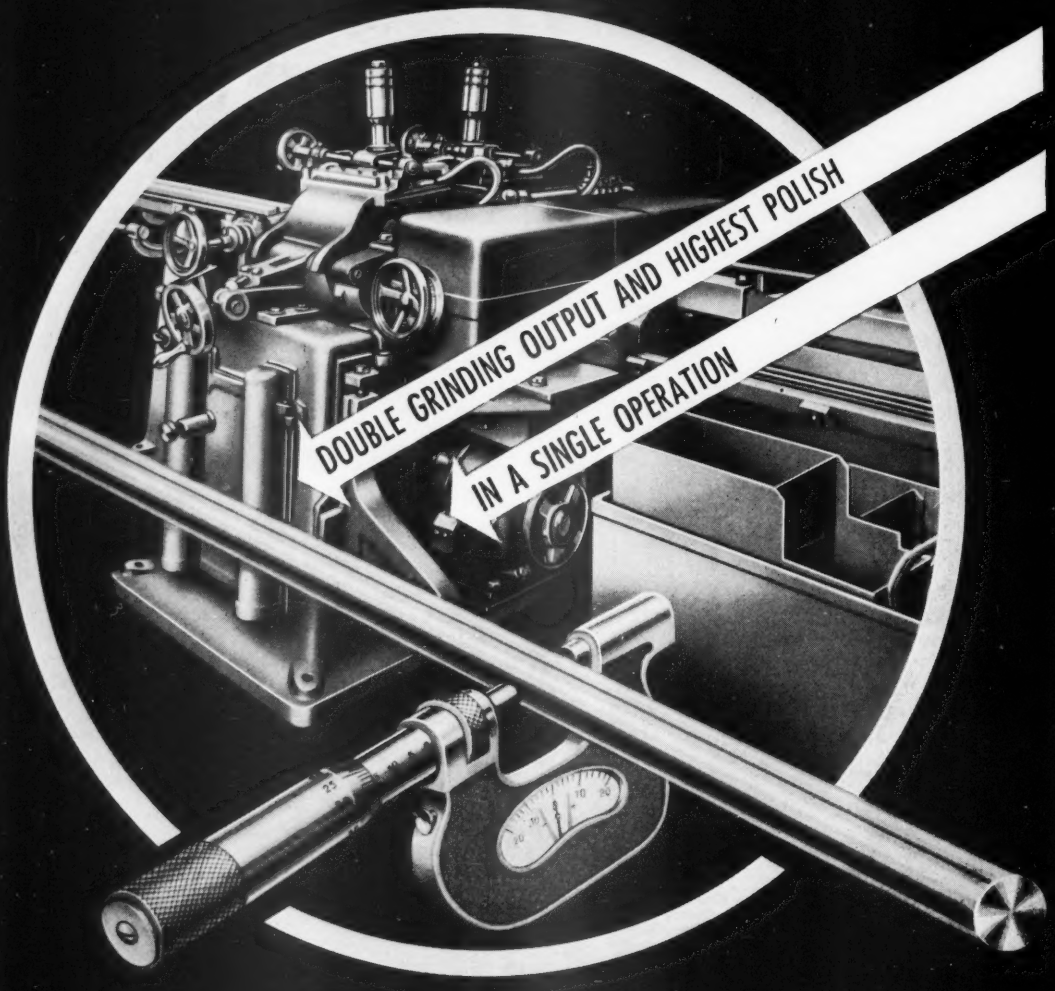
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
9201 EAST 288 STREET, WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

SCHUMAG AACHEN

GRAPHIK JUPP KUCKARTZ

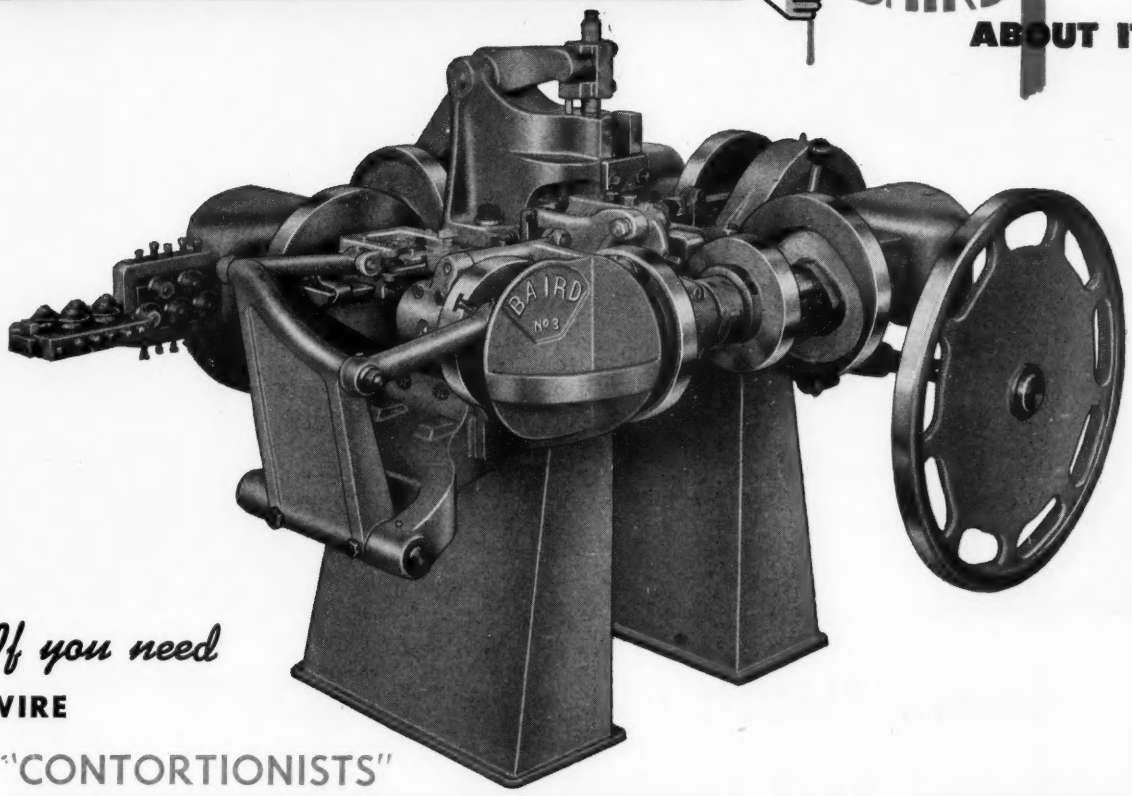
CENTERLESS BAR GRINDING AND POLISHING MACHINE



SOLE AGENTS IN USA, CANADA & MEXICO:
American Laubscher Corp.,
333 West 52nd Street, New York 19, N.Y.

. . . IF IT'S A HIGH PRODUCTION PROBLEM . . .

ASK BAIRD ABOUT IT



If you need

WIRE

"CONTORTIONISTS"

The BAIRD FOUR-SLIDE is your FORMING MACHINE

There is probably no machine in the world that can make a greater variety of parts . . . or produce them any faster . . . than the Baird Four-Slide. It seems that there must be a limit to the fashioning of small wire and metal ribbon products *by hand* . . . and then tooling a Baird Machine to make them *automatically.* Yet, new shapes are continuously submitted to us . . . and we still find the solutions.

Taking coiled wire from a reel, the machine straightens, feeds, and cuts off the required length . . . then forms and ejects the part. Different sizes of standard machines give you a selection of wire lengths to 32½" . . . dia. to ½" or flat ribbon metal products to 1½" wide. Special attachments such as *secondary cut-offs, lettering, form raising, pin pulling, nail pointing, vertical forming and stripping, ring setting, etc.,* extend the versatility of operations.

Thus you may purchase your machines for specific repetitive production, then, at any time, add special attachments as your production requirements indicate. At all times you may count on Baird engineers for development of tooling from your parts or specifications.

This is your profit-making machine. Send for the Baird Four-Slide Bulletin.

2BA54

THE BAIRD MACHINE COMPANY
STRATFORD CONNECTICUT

WHERE YOU WILL GET THE HELP OF SPECIALISTS ON THESE ESSENTIAL PRODUCTION PROBLEMS:

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

General Electric uses Fiber·Glass tape to withstand high temperatures, heavy overloads

This photo shows Fiber·Glass tape being applied to a field coil, in the manufacture of General Electric Armored Motors, type MD.

These motors, produced by the Erie, Pennsylvania Works of General Electric Direct Current Motor and Generator Department, are used in the toughest applications—as steel mill auxiliaries, ore bridge, crane, hoist, and electric shovel applications. They need the finest insulation available to withstand high temperatures and heavy overloads, hence the use of Fiber·Glass.

Tapes made with L·O·F Fiber·Glass are used where prolonged overloads generate heat too great for organic tapes. They are strong. They resist moisture.

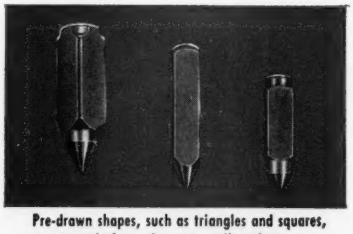
For the wire and cable industry, Libbey·Owens·Ford produces a complete series of continuous filament yarns, including: 75, 150, 225, 450 and 900 series. They are made in a variety of single- and multiple-end packages for use on standard wire-covering and textile machines. Waxed yarns are available, as well as special after-treatments.

Consult us on your electrical needs. Contact your nearest L·O·F office (offices in 26 major cities). Or, write: Libbey·Owens·Ford Glass Company, Fiber·Glass Division, 26-84 Wayne Building, Toledo 3, Ohio.

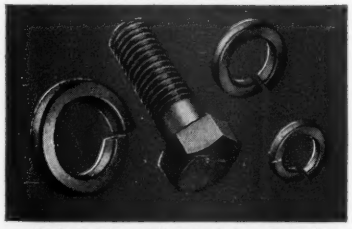
L·O·F GLASS · Corrulux · FIBER-GLASS

FIBER · GLASS

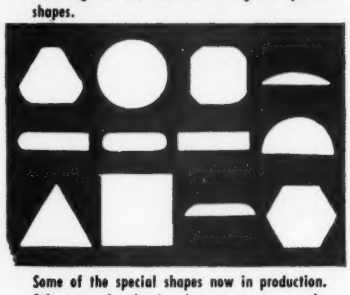
LIBBEY • OWENS • FORD GLASS COMPANY
FIBER • GLASS DIVISION



Pre-drawn shapes, such as triangles and squares, are naturals for carburetor needle valves.



Hex-head bolts and flat-wire lock washers take advantage of the material savings of special shapes.



Some of the special shapes now in production. Others can be developed to meet your needs.

ALLOY

Special Wire Shapes

CUT COSTS

Improve Product Performance

Alloy Special Wire Shapes eliminate costly machining time and cut metal waste. No need to start with round wire and then machine half of it away to get the shape you want. Alloy Metal Wire Division is ready to supply you with Stainless and Nickel Alloy wire in just about any special shape you may require. Some of the standard shapes available are shown here. We will be more than willing to work with you in the development of any other shape.

Drawn Alloy Wire Shapes provide other advantages in addition to reduced costs. Product quality and performance are also improved. The drawn wire insures uniformity of cross-section and a smooth, flaw-free surface.

For more details on Alloy Special Wire Shapes or for information on Stainless, Nickel Alloy or Electrical Resistance Wire, Rod and Strip, drop us a line. We are happy to be of service to you.

"Quality Products since 1919"

ALLOY METAL WIRE DIVISION

H. K. PORTER COMPANY, INC.

of Pittsburgh

PROSPECT PARK, PENNSYLVANIA

1

Again . . .

WELDCO MONEL HOOKS PROVE THEIR SUPERIORITY

FOR LONGER LIFE, GREATER STRENGTH, EXTRA CORROSION-RESISTANCE

IT'S WELDCO RIGHT DOWN THE PICKLING LINE!

SEVERAL YEARS AGO, a Joliet wire mill ordered 4 Weldco Monel pickling hooks. These hooks soon proved so superior to heavy cast hooks (also in use) that 16 more were installed, and the cast hooks were diverted to lighter service. So once again, as in many other cases, Weldco replaced heavy, old-style hooks right down the pickling line. The reason: Weldco hooks are stronger, lighter in weight, easier to handle, more corrosion-resistant, and carry heavier loads.

The Weldco pickling hook shown above carries 5,000-lb. loads easily . . . has a special notched lifting "bale" for use with a double-crane hook. This design helps balance the load—makes possible rapid, efficient handling, with less manpower needed. Weldco engineers built this hook to meet the requirements of one particular mill, and can do the same for **your** plant.

Depend on Weldco's ingenuity and years of fabricating experience, for all your pickling and liming equipment. Whether you need conventional lightweight Monel hooks or special adaptations, Weldco engineers design and build to meet your exact requirements. For complete pickling information, get in touch with us today.

WELDCO

THE YOUNGSTOWN WELDING & ENGINEERING COMPANY

3723 OAKWOOD AVENUE . . . YOUNGSTOWN 9, OHIO

HUBBARD Can Supply You With All Types of

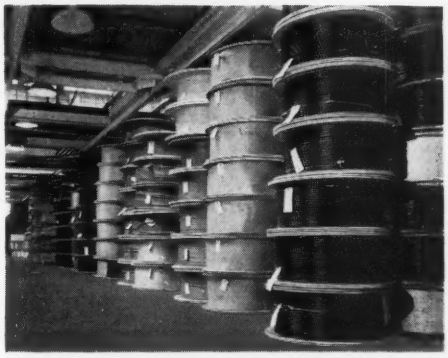
NON-RETURNABLE SPOOLS and REELS

for

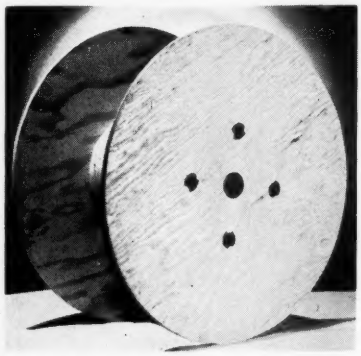
WIRE • ROPE • TAPE • BRAID • PLASTIC EXTRUSIONS

Pictured and described below are a few of these types:

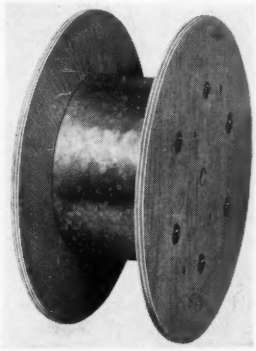
Cutting cores to length and assembling reels.



Hubbard non-returnable reels loaded and ready for shipment.



Reel with plywood flange with cardboard hub assembled with tubular rivets for non-returnable and export shipments.



Reel with plywood flange and galvanized steel hub assembled with tubular rivets and special washers for heavier loads.

Reel with masonite flange and cardboard hub assembled with steel end washers for domestic or export shipment of wire, tape, braid or other materials.

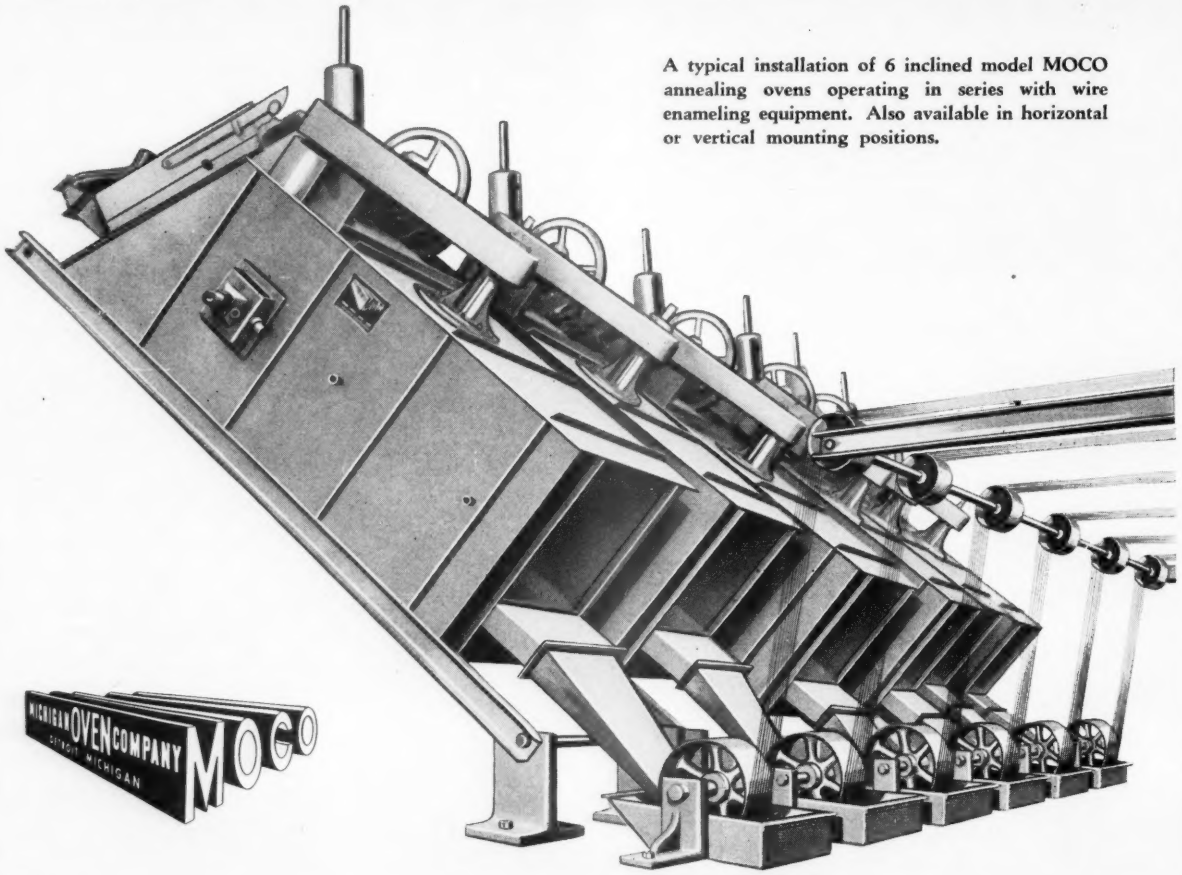
OTHER TYPES OF ALL-WOOD OR PLYWOOD SPOOLS AND REELS IN ANY COMBINATION OF CONSTRUCTIONS THAT WILL SUIT THE CONDITIONS OF USE AND SHIPMENT.

Special reels will be made to your specifications.

HUBBARD SPOOL COMPANY

GARRETT (Tel.: Garrett 840) INDIANA

"THE BIGGEST NAME IN SPOOLS AND REELS"



A typical installation of 6 inclined model MOCO annealing ovens operating in series with wire enameling equipment. Also available in horizontal or vertical mounting positions.

NOW—Higher Operating Speeds at Lower Temperatures with New Gas-Fired Annealing Oven

Here is a new strand annealing oven with revolutionary design features which will eliminate or greatly reduce strand annealing problems where inert atmospheres are required. Designed and engineered by the Michigan Oven Company, these ovens utilize advanced mixing and burning principals which exclude the need for troublesome external sources of steam or other inert atmospheres. Tried and proven in over 30 successful installations, these ovens are daily producing high quality wire at a greater range of speeds with less operating and maintenance costs.

HIGHER DEGREE OF ANNEAL *WITH LESS FUEL CONSUMPTION*

A greater degree of anneal is effected at low oven temperatures by the high heat transfer efficiency of MOCO's volumetric recirculation. Fuel consumption is amazingly low.

FUEL VERSATILITY AND HEAVY DUTY CONSTRUCTION

A wide variety of gas fuels may be used. Ovens can be switched to standby LPG fuels in a matter of seconds. The rugged welded construction offers you the greatest possible efficiency for years of continuous trouble-free operation. You'll be pleased at the reasonable price of these units. For complete information or an estimate on your needs—call in your MOCO representative or contact MOCO in Detroit today.

PRODUCERS OF COMPLETE ENAMELING SYSTEMS FOR ALL WIRE SIZES

- Glass, silicone, or textile varnish impregnating ovens.
- Tinning machine pay-off and take-up mechanisms.
- Organasol coating machines.
- Lacquer towers.
- Cloth treating ovens and equipments.

MICHIGAN OVEN COMPANY

425 BRAINARD
DETROIT 1, MICH.

Story of a contractor who lost his shirt

(or why use ELGIN Diamond)

Once upon a time there was a contractor. He was a good contractor. He worked hard, knew his business, did all the things that help pile up the bucks. This contractor built houses, hotels, highways, anything . . . and that meant concrete. Why, he used so much concrete it just wasn't funny.

One day, a salesman from a new kind of company called on our contractor and tried to sell him "ready-mixed" concrete.. "Ready-mixed" concrete . . . now wasn't that a silly thing? Why, he'd been mixing his own concrete for nigh onto 20 years. Why change now? "Ready-mixed" . . . ridiculous.

Well, as it happened, the same salesman called on some of Mr. Contractor's competitors and they thought "ready-mixed" concrete was great, tremendous, terrific. They found there was no waste, it was convenient and even saved them money. It wasn't long before friend contractor lost his shirt. Sad? Yes . . . if only he had *tried* "ready-mixed".

Today, there's a "ready-mixed" type of diamond abrasive on the market called Elgin Diamond. Lots of companies use it—some don't. Those that do have found that with Elgin Diamond there's no bothersome mixing or special grading, no costly waste or chance for error. They also found that because diamond particles are permanently suspended in a specially formulated, color-identified vehicle, they get consistent polishing results.

We're not saying you'll lose your shirt if you don't use Elgin Diamond. We are saying you owe it to yourself and your company to try Elgin Diamond. You can get all the facts by writing.

ABRASIVES **DIVISION**

Dept. G

ELGIN NATIONAL WATCH COMPANY

ELGIN, ILLINOIS

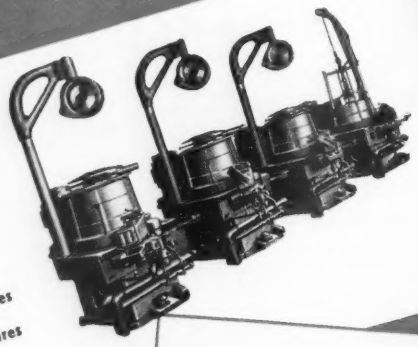
HERBORN

Non-Slip Continuous Wire Drawing Machines

with individual motor drive for each block

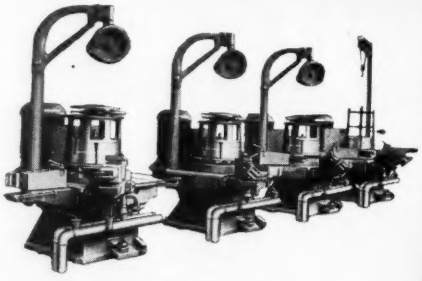
Model G I
with 4 drafts
in single block arrangement

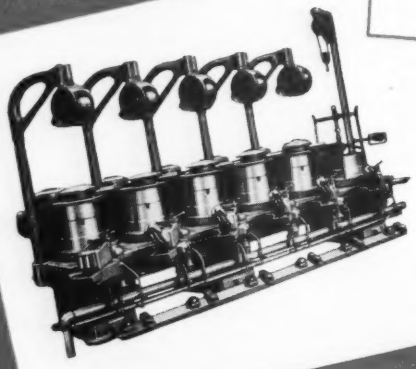
Inlet Φ
Low carbon steel wires .393"
High carbon steel wires .315"



Model G IId
with 4 blocks = 8 drafts
in single block arrangement

Inlet Φ
Low carbon steel wires .275"
High carbon steel wires .236"

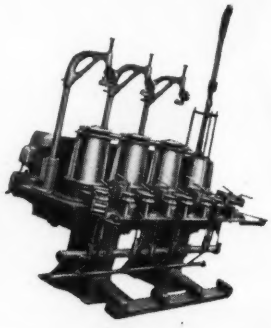




Model G St II
with 6 drafts

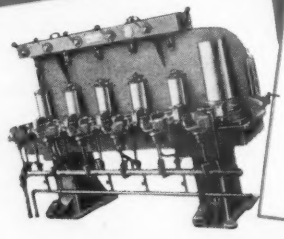
Inlet Φ
Low carbon steel wires .216"
High carbon steel wires .196"

Model GM IIId
with 4 blocks = 8 drafts



Inlet Φ
Low carbon steel wires .118"
High carbon steel wires .0984"

Model GM IVd
with 6 blocks = 18 drafts



Inlet Φ
Low carbon steel wires .063"
High carbon steel wires .0551"

MASCHINENFABRIK HERBORN

BERKENHOFF & DREBES A.-G. • HERBORN (DILLKREIS) GERMANY

Sole Agent in U.S.A.: Kurt Orban Company Inc., 205 East 42nd Street, New York, N. Y. Phone: Murray Hill 4-7700, Cables: ORBANOK, N. Y.

Sole Agent in Great Britain: P. A. Mead Ltd., 3 Vincent Parade, Finsbury Park, London, N. 4, Telephone: ARChway 2127.

The Best is Cheapest

in the long run!

USE

"America's Finest Wire Drawing Lubricants"

MAY WE HELP YOU?

SERVICE CENTERS

JOHN A. MORITZ, Pres., 4600 W. Ferdinand St., Chicago 44, Illinois.

EARL BOWERS, Vice Pres., 66 Dolphin Drive, St. Petersburg 6, Florida.

GREY VERNER, Tech. Dir., 4600 W. Ferdinand St., Chicago 44, Illinois.

ROBERT L. BARTON, 3249 Roanoke Rd., Kansas City 8, Missouri.

ARTHUR J. O'MARA, c/o Standard Industrial Compounds Co., Millbury, Mass.

BRUCE SIEMON, 2400 Morrow Place, Pittsburgh 34, Pennsylvania.

KENT BOSWORTH, 416 Manhatten Road, Joliet, Illinois.

NEW "REDCOAT" A "NEW COMPOUND FOR THE ELECTRO-CHEMICAL DEPOSITION OF COPPER TO STEEL"

Standard Industrial has pioneered in most of the outstanding contribution to better wire drawing through better lubricants. Consult Standard Industrial for the solution of your difficult problems.

Standard Industrial

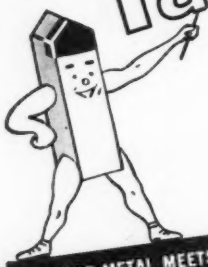
COMPOUNDS CO., INC.

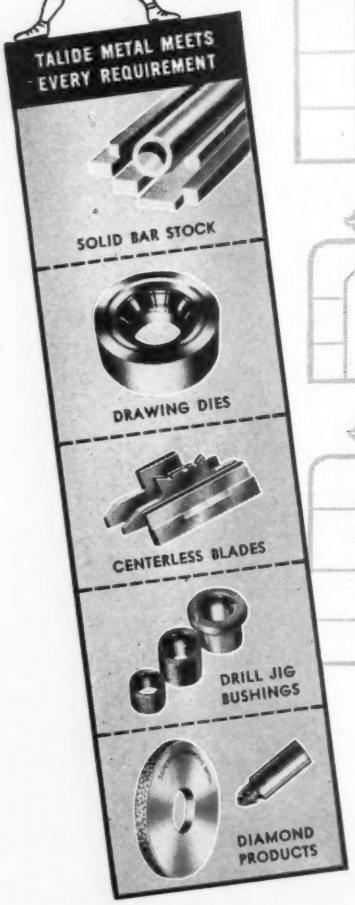
4600 WEST FERDINAND STREET

CHICAGO 44, ILLINOIS

TELEPHONES: Mansfield 6-9324-5-6

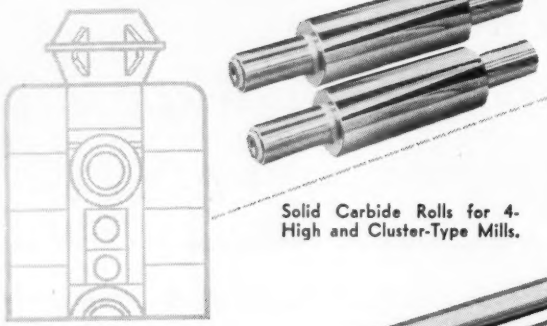
Talide ROLLS double production of your mill





Send for New 84-Page Catalog 54-G or Ask for Sales Engineer to Call.

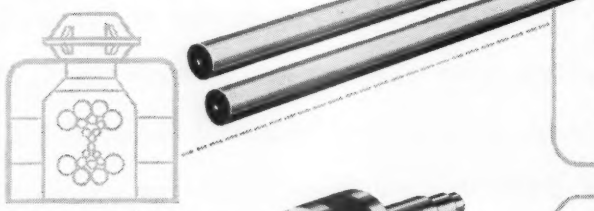
Metal Carbides Corp., Youngstown 7, Ohio



Solid Carbide Rolls for 4-High and Cluster-Type Mills.

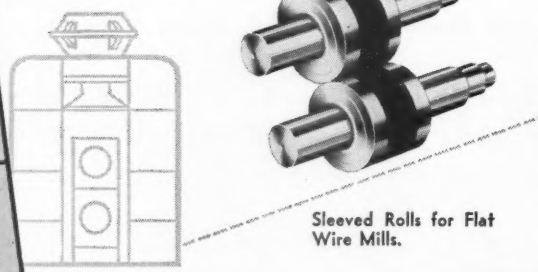
1600 to 20 coils

LARGE PITTSBURGH STRIP STEEL PRODUCER reports rolling 1600 coils of low carbon, high carbon, stainless and alloy steel strip with Talide rolls before same needed regrinding. Best previous service life obtained with steel rolls averaged between 16 and 20 coils.



168 to 7 hours

LEADING OHIO STRIP STEEL PRODUCER averages 750 coils of various types and analysis between grinds, enabling them to operate their cold rolling mill continuously without roll changes for 7 days, 3 turns per day. Previous steel rolls used averaged 6-8 hours, necessitating 3 or 4 roll changes per day with considerable down-time.



Sleeved Rolls for Flat Wire Mills.

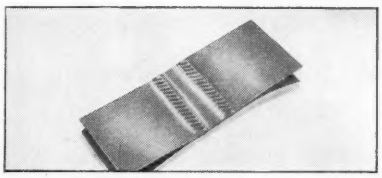
50 to 2 coils

LARGE STEEL PRODUCER of straight chrome and nickel-chrome stainless steel strip now operates continuously for 3 turns or more with Talide rolls, whereas with steel rolls it was necessary to change 7 or 8 pair per turn. 50 coils are now rolled per regrind compared to 2 coils with steel rolls.

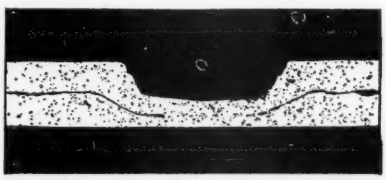
METAL CARBIDES CORPORATION
MC
TALIDE
YOUNGSTOWN 7, OHIO
SINTERED CARBIDES · HOT PRESSED CARBIDES
HEAVY METAL · CERMETS · HIGH TEMPERATURE ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

Simply squeeze like pliers, and presto...

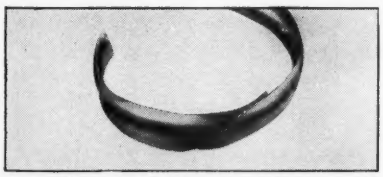
ALUMINUM cable sheathing or shielding IS KOLDWELDED!



You never saw aluminum welded so quick and easy! Photo shows .004 aluminum foil shielding just as it came out of the Utica Lapwelder.



You get a real *weld*, not just a bond. Microphoto shows lapweld in .004 aluminum foil. Note Koldwelded area in center shows actual inter-molecular flow of metal . . . *both* foil sheets become a single homogeneous unit (Photo made by Alcoa Process Dev. Labs., Welding Section, Project K-15).



Koldwelding work-hardens the metal, so weld areas are often stronger than the parent metal itself! Shown is .030 aluminum cable sheathing which was Koldwelded in flat strip, then passed thru machine which wrapped it around a BX-type cable of 4" diameter. Note that neither the great tension nor severe twisting in the machine damaged the Koldweld in the least.

Now being used in production by several major cable manufacturers, UTICA® Koldwelding offers advantages no other type of welding can match! Koldwelded joints are *far stronger*—standard tensile tests on .004 aluminum foil 1" wide measure better than 60 lbs. and the metal breaks outside the weld area. On tear type tensile tests, strength is in excess of 20 lbs. More than that, Koldwelded joints are **dependably** strong—they even go thru the stretching and twisting of BX-type cable covering machines without distortion or fracture...so giving your production a solid boost!

The light UTICA® Koldwelding tool weighs less than 3 lbs. You can carry it from job to job easily, use it in tight spots inside your machines. No special skill is needed—no heat, electricity or fluxes . . . **welding is by pressure alone!** No flash occurs. One set of UTICA precision dies will Koldweld all gauges of aluminum foil from an overall thickness of .002 to .026 and other interchangeable dies will Koldweld aluminum sheets to a maximum thickness of .040, total weld .080. Get all the facts on this new type of welding. Write now for full information.

U TI CA ®

UTICA KOLDWELD

UTICA DROP FORGE & TOOL CORP., UTICA 4, N. Y.

"UTICA" when used in connection with hand tools is a Trade Mark Reg. U. S. Pat. Off.

For the FINEST Dies....

Specify

DIES... TOOLS... WEAR PARTS... BLANKS...

TELEPHONES: FACTORY and BRANCHES

BALTIMORE, MD. HOpkins 7-5078
BIRMINGHAM, ALA. 54-1262
BOSTON, MASS. DExter 2-4456
BUFFALO, N. Y. BAlley 4555
CHICAGO, ILL. HArrison 2-3434
CINCINNATI, OHIO Kirby 2618
CLEVELAND, OHIO WOodbine 1-1742
CLIFTON, N. J. PErsonal 7-8610
DALLAS, TEXAS Dixon 4033
DENVER, COLO. AComa 0889
DETROIT, MICH. UNiversity 4-8400
EAST LANSING, MICH. EDgewood 2-5331
FRANKLIN PARK, ILL. GLadstone 5-3014
HARTFORD, CONN. ADams 3-5197
HOUSTON, TEXAS OSage 3-5277
HUDSON, N. Y. 8-7710
INDIANAPOLIS, IND. BRoadway 9272
KANSAS CITY, MO. Baltimore 1700
LIGONIER, IND. 414
LOS ANGELES, CAL. LOgan 5-9811
LOUISVILLE, KY. Taylor 5960
MILWAUKEE, WISC. FRanklin 4-1364
MINNEAPOLIS, MINN. HYland 9511
MOLINE, ILL. Moline 2-3821
NEW YORK, N. Y. MUrray Hill 3-0291
ORISKANY, N. Y. Utica 6-1988
PHILADELPHIA, PA. TEnnessee 9-5478
PITTSBURGH, PA. Hiland 1-8548
PORTSMOUTH, OHIO Scioto 913Y
ROCHESTER, N. Y. LOcust 4882
ROCKFORD, ILL. Enterprise 2504
SAGINAW, MICH. 4-3384
ST. JOSEPH, MO. 2-0803
ST. LOUIS, MO. Mission 7-0113
SAN FRANCISCO, CAL. YUkon 6-6505
SCRANTON, PA. Diamond 3-1496
SEATTLE, WASH. SEneca 5488
SPRINGFIELD, MASS. SpringSeld 6-2673
SYRACUSE, N. Y. 75-5159
WAUKEGAN, ILL. ONtario 2-5220
WEST NEWTON, MASS. LAsell 7-3102
WICHITA, KANSAS TEmple 8-3476
YORK, PA. 2-8921

IN CANADA: (TOOLS) CARBIDE TOOL COMPANY, LTD. W. Toronto 3, Ont. (DIES) VASCARB TOOL & DIE CO. Hamilton, Ont.

The Wire Outlook

Business should turn upward with the coming of autumn and when it starts, it will keep right on rising through 1955, we are assured by a recent extensive analysis of business conditions.

There is nothing to indicate that there will be a boom and another spiral of inflation, but that the pick-up will be gradual and healthy, based on the work that has been done by government and business to lay a solid foundation for prosperity in the years ahead.

If this works out as anticipated, the current readjustment through which we have been going will prove to have been one of the mildest and shortest on record. The decline, following the peak levels of the Korean war period, will have justified the sound and sane measures of the Administration to bring about an orderly readjustment, with a minimum of disturbance to business.

The expected improvement in business generally may be attributed to a series of factors. Businessmen are showing confidence in government policies. Instead of fear of persecution, there is assurance that everything possible is being done to stimulate private enterprise.

Cuts in income taxes were timed to provide individuals with more purchasing power and further revisions are being planned to eliminate tax inequities and to encourage private investment in industry. Individual incomes have declined only 1.4% before taxes, but only 0.3% after taxes. The spending of people is holding up fairly well and is estimated to be only 1% under that of 1953.

Cuts in Federal outlays have been partially offset by increases in spending for State and local government projects. The drop in personal incomes is attributed to relatively small layoffs and shorter working hours. Outside of decreased wages for workers, other incomes have held up very well.

With the consumption of goods at present outrunning production, it is only a question of time when plants will have to re-hire workers or go on longer work-weeks. While passenger car sales are likely to taper off as the year wears on, the earlier introduction of new models, planned for this year, should give new impetus to sales late in the fall or early winter.

Soft goods manufacturers look for better business in the fall, and because we have 2.8 million more mouths to feed and house in 1954 than in 1953, this should prove a further spur to business. For 1955 it is estimated that another 2.4 million persons will be added to our population. Such growth is bound to be a stimulant to purchases of the necessities of life. Personal spending is expected to rise some 4.5 billions in 1955 over this year.

Federal expenditures for goods and services will probably continue to decline, but at a slower rate than during the first half of the year. State and local governments are increasing the tempo of road, school and other building projects, with 2.2 billions more scheduled for such work this year than last. Births are averaging 11,000 a day.

The chairman of the board of one of the major steel companies recently stated his belief that the bottom of the cycle had been reached and would remain level through the summer, but that too many people had convinced themselves that the best year they ever had was "normal," whereas we actually know it is not.

The top may have been reached in 1953, but in another ten years, it is more than likely that present levels of both unit production and dollar volume will make old peaks look like valleys.

—from the Editor's Desk

Steelskin

Manufacturers of

POWDERS, COMPOUNDS GREASES & COATINGS

for

WET & DRY DRAWING

of

WIRE, TUBING BARS & SHEETS

NON-FERROUS FERROUS

STEELSKIN CXH
Wire-Drawing Powder

More wire is drawn through **STEELSKIN CXH** than any other lubricant.

STEELSKIN CXH is a compounded metallic-stearate-type soap powder used for drawing both high and low-carbon steel wire, as well as many non-ferrous metals. It is being used successfully with all types of coating.

Wire for springs, rope, nails, tire bead, screen cloth, poultry netting, galvanizing and many other applications is drawn through **STEELSKIN CXH.**

And REMEMBER . . . as a STEELSKIN customer, you are entitled to STEELSKIN "on-the-job" service. This service is backed by over 40 years' experience in the field of wire-drawing lubrication.

R. H. MILLER
Company, Inc., Homer 1, N. Y.

STEELSKIN

First in

LUBRICATION!

First in

SERVICE!

Since 1909

FILL IN COUPON AND MAIL TODAY!

Please send more information on

STEELSKIN PRODUCTS

We draw: ☐ Steel ☐ Dry ☐ Sizes .....
☐ Copper ☐ Wet .....
☐ Other — Specify .....

Please have representative call.

Name ..... Title.....

Company .....

Address .....

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 29 August, 1954 No. 8

The Importance of Lime in Wire Drawing

by Thomas C. Miller Technical Director
Industrial Sales Division
National Gypsum Company
Buffalo, New York

Introduction

High specific surface calcium hydroxide produced in the wire mill is the most satisfactory chemical known for promoting proper lubrication in the wire drawing industry. In spite of the fact that substitutes for lime have been used in wire drawing, there has been an increase in recent years in lime tonnage for this purpose. In 1949, 17,700 tons of quicklime were used, while in 1950, this tonnage increased to 19,637 tons.

★ ★ ★

Many other chemicals have been offered as substitutes for lime with claims for their economy, ease of application, uniformity of coating and cleanliness. Some of the substitutes have been offered simply as "lime eliminators," for the purpose of hiding their identity and increasing the sales resistance for lime. Materials which have been used as substitutes for lime include borax, graphite, soda ash, phosphates. The industry is rapidly becoming aware of the fact that substitutes are not as economical and as efficient as a properly applied superior lime coating. It is further realized that lime as a wire coating material has suffered because of the lack of information of the physical and chemical characteristics of calcium oxide and calcium hydroxide.

★ ★ ★

A study has been under way to investigate the physical characteristics most desirable in calcium hydroxide for a satisfactory coating and to devise a plant control method for rapidly checking these characteristics. The work is yet to be completed, but sufficient encouraging laboratory and plant data have been obtained on methods of producing and testing calcium hydroxide suspensions that the results are offered to those interested in utilizing them in their process.

The author received his education at the University of Tennessee, Knoxville, and the University of the South, Sewanee. He was employed by Gager Lime Manufacturing Co. from 1926-1942, serving as chief chemist from 1931. There he specialized in lime plant construction, control and operation and studied special properties of lime products for the chemical industry. In 1942 he joined Universal Atlas Cement Research Laboratories at Buffington, working in chemical analysis of cement products and supervision of the experimental research plant. In 1945 he was appointed to the research staff of The Armour Research Foundation, where he became supervisor of the Masonry Materials Section. He joined the Industrial Sales Division of National Gypsum Company in 1951.

Thomas C. Miller

The Role of Lime in Wire Drawing

Steel wire is reduced in size by drawing through dies to a desirable working diameter. Bars or rods are rolled at a red heat in sizes down to approximately 0.20 inch in diameter. Obviously, no

coating or lubricant is applied to the rods during this hot rolling operation. However, wire possessing definite physical characteristics of hardness, temper, etc. must be drawn cold. The surface of such wire must be lubricated to produce uniform diameter, smooth surface and offer the least resistance to dies.

★ ★ ★

Properly treated clean rods for drawing are first coated with a film of lime in the form of calcium hydroxide. The coated rods are then drawn through a bed of metallic soap grease, or other satisfactory lubricant, where a suitable amount is retained for lubricating the wire and die during the drawing. Wire can be drawn through multiple dies to a diameter of 0.005 inch by this process.

★ ★ ★

The film of dry calcium hydroxide is not a lubricant in the drawing process, but it is employed as a carrier for the metallic soap or other lubricant.

The Role of Lime for Wire Coating

The surface of iron or steel rods is cleaned for the drawing process by pickling in sulphuric or hydrochloric acids to remove scale and rust. The rods are washed in water to remove the acid, and in some cases are dipped in a bath of alkali, such as sodium silicate, to neutralize any remaining acid and improve the bond between lime and wire. Some of the lime substitutes have been used on the premise that they improve the bond between the lubricant and the wire. The efficient application of properly prepared calcium hydroxide forms an excellent bond to the rod and is an efficient carrier for lubricants. If an alkali bath is not used, the coating material must be capable of neutralizing any acid remaining on the rod. It is very significant that calcium hydroxide acts in the double role as a neutralizer and as a coating agent.

★ ★ ★

A coating material must be capable of adhering to the rod in a uniformly thin film which will not "wash" off in the dipping operation. Neither must it drain from the rod before the film is completely dry. The conglutinate properties must be such that the particles adhere to one another and to the rod with such force that they will not easily loosen after drying. The plastic nature of the solid must be such that the particles will resist dusting or brushing off during handling and the adherence to the rods must be sufficient to resist loss when the rod is passed through a guide ring and the lubricant box. In addition, the surface of the coating must be of such a texture that it will form a base for retaining a desirable quantity of lubricant from the die box.

★ ★ ★

Properly prepared calcium hydroxide possesses all of the features that result in a uniform, adhering film of such texture that it is capable of carrying the proper quantity of lubricant to satisfactorily lubricate the wire and dies to produce a sooth uniformly-sized wire.

★ ★ ★

Quicklime (calcium oxide) and hydrated lime (calcium hydroxide) have been used for wire coating with varying degrees of success. The lack of information on the physical properties of both types of lime, with respect to coating ability, has resulted in a failure to explain variations in these properties. However, it is generally known that quick-lime will produce a better type of coating hydrate than will a suspension of commercial hydrated lime. Even with this knowledge of quick-lime some wire drawing mills continue to use a commercial hydrated lime.

★ ★ ★

Lump and pebble quicklime have both been used to prepare wire coating hydrated lime suspensions, but in recent years the trend has been toward increased quantities of pulverized lime as based upon the recommendation of Washburn.[1] This recommendation assumes that a pulverized quicklime will produce a much finer suspension of calcium hydroxide than lump or pebble lime. Recent investigations have failed to prove this to be the case with the commercial product.

★ ★ ★

The methods of burning limestone also have some relation to the characteristics of the calcium hydroxide suspension made from it. Many wire mills utilized shaft kiln calcined lump quicklime for many years before changing to pulverized quicklime. Lump quicklime has produced satisfactory coatings where care was used in the hydration and aging process, but variation in physical characteristics were more evident than in limes produced by other methods of calcination.

★ ★ ★

The fineness of calcium hydroxide in an aqueous suspension is directly related to the dipping characteristics and the adherence properties of dry hydrate coating. Since the fineness of a hydrated lime is also related to the method of calcining limestone a comparison should be made between shaft kiln and rotary kiln quicklimes and commercial hydrated lime.

Shaft Kiln Quicklime

Lump or pebble shaft kiln quicklime is produced by burning limestone in vertical shaft kilns. Generally, lumps of limestone from six inches to 12 inches in greatest dimension are exposed to the direct combustion of gases in these kilns for periods of 48 to 72 hours, depending upon the size of the kiln and the method of operation. Therefore, limestone in a particular kiln may not be exposed to these temperatures at a constant or a uniform rate.

★ ★ ★

The design and operation of most present day shaft kilns have not been conducive to uniform burning, and these kilns produce a mixture of overburned, soft burned and underburned (containing limestone or core) lime. Such a product must be carefully inspected to remove the undesirable constituents. While it is an easy task for the manufacturer to separate the unburned portion, it is next to impossible to visually separate soft burned quicklime,

and in some cases hardburned lime, from overburned lime, because of the similar appearance of the three types of lime. Therefore, shaft kiln quicklime is very likely composed of non-uniformly burned lime.

★ ★ ★

The length of time that limestone or quicklime is subjected to the heat of the calcining process has considerable influence upon the hydrating characteristics. It is generally known that the softer burned product has the greatest affinity for water and that this affinity decreases as the time of calcining or the temperature of calcining increases or as the time-temperature rate is changed. The time or temperature of calcining or the time-temperature rate of calcining can be such that a very inactive hydrating rate is obtained. Therefore, the most reactive product is one calcined at the lowest temperature for the shortest length of time.

★ ★ ★

The particle size of a hydrated lime depends upon the reactive rate of the quicklime. The softest calcined lime produces a hydrate with the smallest particle size or the highest specific surface. The particle size increases, or the specific surface decreases, as the quicklime decreases in reactivity. The particle size decreases, or the specific surface increases, as the quicklime increases in reactivity.

★ ★ ★

Shaft kiln quicklime produces hydrates of the largest particle size or lowest specific surface of any type of quicklime. Some industries, as the pulp and paper, prefer this type of lime in the causticizing process over all other types for this reason. Because of this characteristic, shaft kiln quicklimes are not recommended for wire coating suspensions.

★ ★ ★

During the early years of the wire industry, where only shaft lime was available, some of the objectionable features were overcome by aging lime putty for periods of several months before it was made into dipping suspensions. During this aging period the maximum amount of hydrated lime was obtained, even from overburned quicklime, to produce a coating material. Under present methods of production such extreme measures cannot be undertaken, especially where more satisfactory materials are available.

★ ★ ★

Shaft kiln quicklime generally does not have the high reaction rate comparable to rotary kiln lime. Even with hydrating water at 212°F (boiling) the violent reaction common to rotary kiln lime does not take place. Consequently, it is not anticipated that this lime will produce a hydrate with an extremely high specific surface, even when sufficient water is present to produce material in the form of a stiff putty or a suspension of approximately 6—10 grams solid per 100 ml of suspension.

Rotary Kiln Quicklime

Pebble rotary kiln quicklimes are calcined in nearly horizontal revolving kilns ranging from 125 feet to 400 feet in length operated at effective temperatures slightly above the decomposition temperature of limestone. Limestone ranging from ¼ inch to 2½ inches is calcined in these kilns for periods less than three hours for the longest kiln. The stone is in constant motion and travels through the kiln, at a rate dependent upon the speed and the angle of inclination of the kiln, countercurrent to the gas flow. The stone occupies a relatively small proportion of the cross sectional area of the kiln and, therefore, is calcined by radiation from the combustion gases or by contact with the refractory lining.

★ ★ ★

Rotary kiln quicklime is the most reactive of the two types mentioned because of the low calcining temperature and the short exposure time to the calcining heat. However, the reactivity of this type lime can be impaired by changes in temperature and time of exposure to heat just as shaft kiln quicklime can. However, impairment in activity is not as likely with rotary kiln operation, because temperature and speed operations are under constant control.

★ ★ ★

Rotary kiln quicklime can be hydrated quickly to a small particle size or a maximum specific surface because of the high rate of activity with water. The hydration reaction of soft calcined, active rotary kiln lime is instantaneous, and if the quantities of water and lime are not accurately proportioned and constantly agitated, the reaction can become violent. To accomplish the maximum fineness in the hydrated product it is necessary to maintain a high temperature involving a vigorous reaction bordering on violence, which should present no problem as long as an excess of water is present to satisfy the requirement of the lime and produce a consistency from that of a stiff putty to a suspension containing approximately 6—10 grams of solid per 100 ml. With proper precautions, there should be no reason to fear the reaction with this type lime. These characteristic reactions identify the desirable features of a good lime capable of producing a high specific surface hydrate and distinguish it from a shaft kiln product.

Pulverized Quicklime

The reaction rate of particles of any material is proportional to the surface area of the particles and the ratio of the surface area to the total volume. A lump or pebble of any material will be more reactive if the pebble is divided into two pebbles and still more reactive if the two pebbles are divided into two more pebbles. As this subdivision is continued the surface area will increase in proportion. As the surface area of quicklime is increased, the reactivity will increase. However, this subdivision has a limiting value dependent upon the ratio of the surface area to the total volume.

★ ★ ★

As an example, consider lumps or pebbles of quicklime as spheres six inches, one inch and one-eighth inch in diameter. The six inch lump will be less active than the one

inch pebble and still less active than the one-eighth pebble if they are calcined to the same degree. Conversely, the one-eighth inch pebble will be more reactive than the one inch pebble and considerably more reactive than the six inch pebble or lump if the particles are calcined to the same degree. The reason for these differences is the variation in surface exposed to the reactant. The six inch pebble or lump has a surface area of 113 square inches and a total volume of 113 cubic inches, the one inch pebble has a surface area of 3.1416 square inches and a volume of 0.5236 inches, and a one-eighth particle has a surface area of 0.049 square inch and a volume of 0.001023 cubic inch. On the basis of the volume of the particles, the six inch particle is equivalent to 216 particles one inch in diameter and 110,459 particles one-eighth inch in diameter. The surface area of these particles is 678.6 square inches for the one inch particles and 5,413.5 square inches for the one-eighth inch pebbles. Thus, the surface area of the one inch particles of the same volume is six times the area of the six inch lump and the surface area of the one-eighth inch particle of the same volume is forty-eight times the area of the six inch lump. Likewise, the one inch pebble is equivalent to 512 pebbles one-eighth inch in diameter with a surface area 25.1 square inches, which is eight times the surface of the one inch pebble.

★ ★ ★

A tabulation of the particle size data, shown below, indicates this relationship:

TABLE 1

Comparison of the Surface Area to Volume of Particles

Particle Diameter	Surface Area	Volume
6"	113 $in.^2$	113 $in.^3$
1"	3.1416 $in.^2$	0.5236 $in.^3$
1/8"	0.0490 $in.^2$	0.00123 $in.^3$

The size reduction is limited because of the danger of producing particles so small in diameter that they have a much greater proportion of surface area to volume to defeat the purpose of surface activity. After careful consideration of the limits of the surface-volume relationship, a product was developed which would possess high activity and yet the particles are large enough to maintain a high volume to surface ratio to reduce the possibility of surface contamination. This product known as a special size lime ranges approximately from 1/8 inch to 3/8 inch. The exposed surface area produces great activity and yet does not possess any of the disadvantages of a pulverized quicklime.

★ ★ ★

All pulverized quicklime commercially produced from either shaft kiln or rotary kiln pebble lime does not have the high reaction rate of lump or pebble products. Consequently, hydrated lime produced from a pulverized product, even with water at 212°F (boiling), is not expected to produce a hydrate with a specific surface comparable to the pebble product. This has been proven in laboratory and plant tests.

TABLE 2

Surface Area and Volume of Spheres

Surface area $= \pi d^2$, Volume $= \frac{\pi d^3}{6}$

Ratio of Surface Area to Volume $= \frac{\pi d^2}{\frac{\pi d^3}{6}} = \frac{6}{d}$

Diameter Mesh	Diameter Inches	Surface Area $in.^2$	Volume $in.^3$	Ratio Area to Volume
	6	113.09	113.09	1
1/4	0.25	1.961×10^{-1}	8.181×10^{-3}	24
1/8	0.125	4.909×10^{-2}	1.0227×10^{-3}	48
100	0.0059	1.0936×10^{-3}	1.0754×10^{-7}	1,016.95
200	0.0029	2.6421×10^{-5}	1.2771×10^{-8}	2,068.96
325	0.0017	7.2118×10^{-6}	2.5725×10^{-9}	3,529.41
2u	0.00007874	1.9478×10^{-8}	2.5562×10^{-13}	75,848.00
1u	0.00003937	4.8696×10^{-9}	3.1953×10^{-14}	152,400.30

The reaction rate might be more vigorous if a pulverized quicklime could be produced with no contamination from constituents in the air. However, commercial pulverized quicklimes are produced in roll or ball mills with air separation. During air classification the finest portion is separated from coarse material and discharged into the finished product bin, while the coarse fraction is returned to the mill for further grinding. Exposure of the fine particles to the streams of air subjects the material to contamination from moisture and carbon dioxide. The surface of these particles is highly reactive because the majority of them are from the interior of the lumps or pebbles. Being soft burned, these particles have an affinity for any material they normally would react with.

★ ★ ★

If moisture and carbon dioxide are present in the air stream, the surface of the dry particles will become converted to either calcium hydroxide or calcium carbonate. Reaction of dry particles with moisture or carbon dioxide, under these conditions, takes place at a very slow rate with scarcely any perceptible temperature rise. Products from the reaction are relatively coarse in particle size and very low in specific surface because of the slow reaction. If moisture or carbon dioxide are not present, the

surface of the very porous particles will absorb a film of air. When the surface is contaminated by any of these reactions, the interior of the particle will become isolated from any reacting medium by this surface seal and the reaction may be extremely slow.

★ ★ ★

The high proportion of the surface to the volume of the particle, for small spheres, may decrease the reaction rate to an alarming level. When it is considered that the ratio of the surface of a particle to its volume is

$$\frac{\pi d^2}{\frac{\pi d^3}{6}}, \text{ or } \frac{6}{d},$$

it becomes apparent that the surface problem becomes a major consideration. Table 2 shows the surface area and the volume of particles of various sizes from six inches to 1 micron (u) and the ratio of the surface to the volume.

★ ★ ★

For example, a particle ⅛ inch in diameter has twice the proportion of surface to volume than that of a ¼ inch particle and 48 times the ratio for a six inch lump of material. As the diameter decreases, this ratio increases by six divided by the diameter. A particle of 100 mesh size has 1017 times as much surface to volume, a 200 mesh particle 2070 times, a 325 mesh particle 3530 times and a 1 micron particle 152,400 times as much surface to volume. Therefore, any material influencing or contaminating the surface of extremely fine particles should be of major importance to consumers as a source of influence to any process.

★ ★ ★

Considering the ratio of surface area to volume of a particle further, the volume of a 325 mesh particle is 2.5725×10^{-9} in^3 and it will require 397,551 particles to be equivalent to one particle ⅛ inch in diameter. The surface area of a 325 mesh particle is 7.2118×10^{-6} in^2. Therefore, the total surface area of this equivalent number of 325 mesh particles is 2.867 in^2. Since the surface area of a ⅛ inch particle is 0.04909 in^2, the surface area of this number of particles equivalent to one ⅛ particle is 58.4 times the surface of the single ⅛ inch particle. The volume of a 1 micron particle is 3.1953×10^{-14} in^3 and it will require 32,005,000,000 particles of this volume to be equivalent to one ⅛ inch particle or 80,510 particles to be equivalent to one 325 mesh particle. The surface area of a ⅛ inch particle being 4.909×10^{-2} in^2 and a 325 mesh particle being 7.2118×10^{-6} in^2, the total surface area of the equivalent 1 micron particles is 155.85 in^2 and .00392 in^2 respectively. Therefore, the surface area of the equivalent number of particles of 1 micron diameter is 3175 times the surface of one ⅛ inch particle and 43.2 times the surface of a 325 mesh particle. The volume of a 2 micron particle is 2.5562×10^{-13} in^3 or approximately 1/12 that of a 1 micron particle. The surface area of a 2 micron particle is 1.9478×10^{-8} in^2 or 1/25 the surface of a 1 micron particle. Pulverized quicklime with a specific surface of 9000 cm^2/g has a mean particle diameter of approximately 2 microns.

★ ★ ★

The ratio of surface area to volume becomes of major importance in exothermic and heat-exchange reactions. For example, a large amount of heat is evolved when calcium oxide is converted to calcium hydroxide, and advantage is taken of this heat to assist in the development of particles of high specific surface during the hydration reaction. If the volume, or mass, of the particle is so small that the temperature of the high-ratio surface of the particle prevents the mass of material from reaching the desired temperature, the exothermic reaction will be subdued. And, since the specific surface of the resulting calcium hydrate is dependent upon the temperature of reaction, this specific surface will be decreased in proportion to the decrease in the reaction time and temperature of the particles. Any particle having a high ratio of surface to volume, in such proportion that the mass or volume is instantaneously influenced by the surface, will influence the characteristics of a final product in a heat-exchange process. Pulverized quicklime is largely composed of minute particles whose surface area ratio is many times the volume and which are subject to great influences in temperature changes to defeat the production of high specific surface calcium hydroxide.

★ ★ ★

In choosing a product for the most efficient size for the production of high surface hydrate, a material is produced in which the temperature of reaction is at a maximum level and whose sphere-volume is at a high ratio, to avoid instantaneous influence by temperature variations. This material possesses a ratio of surface area to volume less than 100, which compares to an average ratio of 75,848 for a pulverized quicklime having a specific surface of 9000 cm^2/g in which the mean particle diameter is 2 microns. The increase in the surface-volume ratio of the pulverized quicklime (75,848) compared to particles having this ratio less than 100, or 7500 times less, has a far-reaching effect upon the character of the finished products. There is no doubt that the ¼ inch x ⅜ inch special pebble quicklime will satisfy the requirements of certain industries with much more favorable results than finer quicklimes, as based upon this mathematical comparison.

★ ★ ★

It is impossible to eliminate all surface contamination during the calcining of limestone. Shaft kilns and rotary kilns alike subject the lime to contamination from over heated refractory, though such reactions are held to a minimum. Rotary kiln lime is subject to surface contamination from fuel residues not consumed during combustion, but these impurities are held to a minimum by efficient operating procedure. When such contamination does occur and the lime is pulverized in commercial equipment, the contaminated portion of lime is ground with the lime to extreme fineness. In a wire drawing suspension of hydrated lime these small particles will not settle out because of their small

mass and they will adhere to the wire to become a source of trouble from scratching or poor wire adhesion. An otherwise high quality lime may become an inferior product from poor coating, scratching or adhering properties. Suspensions from lump or pebble lime are relatively free of these contaminated particles by settling out from the much finer calcium hydroxide.

★ ★ ★

With all factors considered for commercial pulverized quicklime it is apparent that it is a poor substitute for reactive pebble quicklime.

Commercial Hydrated Lime

Quicklime is hydrated commercially in machines with sufficient water to satisfy the requirement of the calcium oxide to be converted to calcium hydroxide with only a slight excess of water (2%-4%). Under such a system full advantage is not taken of the exothermic reaction to produce particles as small or of the high specific surface as can be obtained with a larger proportion of water. Thus, commercial hydrated lime has a much lower specific surface than can be produced from quicklime in the wire mill. The specific surface of commercial hydrates from shaft kiln quicklime ranges from 9000 cm^2/g to 20,000 cm^2/g. Hydrates from rotary kiln quicklimes are approximately 20,000 to 25,000 cm^2/g.

★ ★ ★

Extremely fine hydrates produced in the wire mill from quicklime can be increased in specific surface, by a proper equipment, to improve coating adherence. Commercial hydrates require much more energy for reduction in particle size and consequently never attain this adherence efficiency.

★ ★ ★

Commercial hydrated lime contains less impurities than will be found in pulverized quicklime by virtue of the air separating system used to discard the unhydrated and contaminated portion of the dry hydrate powder. Therefore, there is likely to be far less scratching of the wire surface during the drawing operation. This attribute is overshadowed, however, by the lack of the necessary specific surface to produce a coating of proper thickness or adhering properties.

Testing for Lime Characteristics

Various means of testing calcium hydroxide suspensions have been used in the attempt to correlate some property of the lime with its characteristics in wire drawing. Chemical analyses have failed as a measure of any of its properties. Settling rates of the calcium hydroxide suspension likewise have failed to show whether a lime is or is not a good coating material, or whether a good coating lime has reached a state for poor coating.

★ ★ ★

If a calcium hydroxide suspension could be maintained in an uncontaminated condition or did not change in composition during use, settling rate data may be helpful in predicting coating characteristics. However, changes in composition during the coating process alter the characteristics of the solid material. If precoating solutions are used on acid pickled wire or if an atmosphere high in carbon dioxide is constantly exposed to the surface of the suspension, the calcium hydroxide is subject to decomposition changes. In addition, aqueous suspensions and colloidal hydrated calcium hydroxide ($Ca(OH)_2 \cdot X\ H_2O$) may form to change the settling rate of the suspension and form large crystalline solid ($Ca(OH)_2 \cdot X\ H_2O$) on drying, which has poor adhering properties.

★ ★ ★

Precoating solutions such as sodium silicate, used to neutralize acid from the pickling bath, may effect the calcium hydroxide suspension, especially when the silicate is not baked on the wire following immersion. Colloidal sodium silicate introduced into the lime suspension can change part of the lime to calcium silicate which may react as a colloid or as a coarse precipitate depending upon operating conditions.

Finely divided calcium hydroxide in suspension can be very easily changed to calcium carbonate when the atmosphere contains an appreciable quantity of carbon dioxide. Vigorously agitated suspensions are especially subject to this carbonation because of the introduction of bubbles of air into the suspension or the exposure of large areas of suspension surface to the atmosphere. Suspensions have been tested where the solid fraction is made up almost wholly of calcium carbonate. When this occurs, the coating is likely to be inferior because the specific surface of such materials is below the level for good adherence. Calcium carbonate of lower specific surface does not possess the bonding tendency between the particles themselves or between the particles and the wire exhibited by higher surface carbonate or by calcium hydroxide.

★ ★ ★

One of the most serious conditions influencing lime coating or wire is the formation of crystals of a higher hydrate of calcium hydroxide or ($Ca(OH)_2 \cdot X\ H_2O$). The formation of these crystals is not too well understood, but their influence on the adherence of lime to the wire surface is very serious. In suspensions, these crystals, whatever size, impart a colloidal characteristic to the calcium hydroxide. Being colloidal by nature they impede the settling of the calcium hydroxide from suspension, which make a settling rate test meaningless. This is a favorable attribute in lime suspensions for wire coating, if it was not for the fatal reactions upon drying. When such a suspension is dried, these crystals assume well defined forms and size which are visible to the normal eye. They have been observed to be flat, thin plates of various lengths up to ¼ inch.

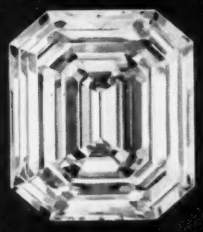
★ ★ ★

A suspension of calcium hydroxide containing these particles will be difficult to dry after the wire has been dipped. Upon drying, the crystals form an interlocking design on the wire with little or no adherence between them and the wire. A slight jar of the wire will

Here is perfection!

ROEBLING high carbon wire is unsurpassed for industry today. Roebling wire is absolutely true to specifications ...absolutely uniform in gauge and finish. Manufacturers who try Roebling wire once, become Roebling customers from then on.

You *pay* for the best when you buy high carbon wire. Make sure that you *get* it! Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.



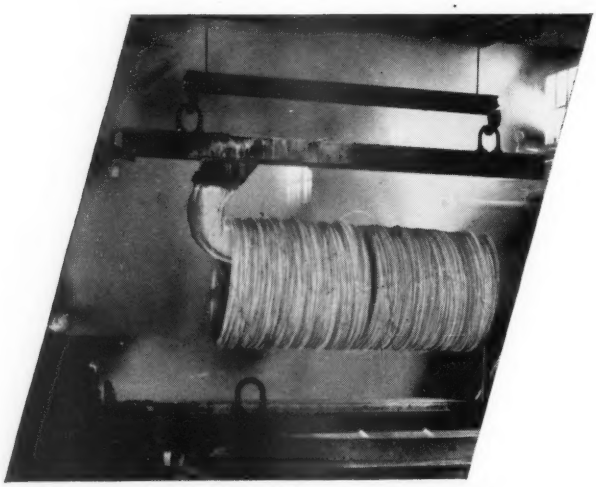
The Jonker, world's largest emerald-cut diamond.

ROEBLING

A subsidiary of The Colorado Fuel and Iron Corporation

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

better rod coating with 37.5% less lime!



Because of the unusually pure composition and fine, uniform particles of Gold Bond High Calcium Quicklime, a greater surface area can be covered per roll of rod. There's less scratching, less wear on drawing dies and fewer defects in your finished product. And you can actually cut lime needs up to 37.5% —from 8% lime and 92% water, down to 5% lime and 95% water. On your next run, try Gold Bond High Calcium Quicklime for a more efficient operation. For technical advice on any of your lime problems, consult your Gold Bond Representative.

NATIONAL GYPSUM COMPANY • BUFFALO 2, NEW YORK

Gold Bond
INDUSTRIAL PRODUCTS

HIGH CALCIUM QUICK LIME

cause the film of hydrate to be lost. Sections of film one to two inches in length from the complete circumference have been observed to fall from wire. Close observation of the film, especially the side which has been in contact with the wire, showed the interlocking characteristics of the crystals as well as their size. Suspensions containing this colloidal material evidently had been used for a sufficient length of time to permit the water to become supersaturated with calcium hydroxide which evidently precipitated from solution. Suspensions of this composition are too inferior to be used for wire coating and should be discarded.

★ ★ ★

An investigation has been under study for a method of producing an aqueous calcium hydroxide suspension with better coating characteristics and the development of a test of the calcium hydroxide to rapidly correlate a physical characteristic with its coating ability. The specific surface of the dry calcium hydroxide from the suspension is indicative of its coating ability. Also, the type of lime used and the method of hydrating can control the specific surface of the resulting calcium hydroxide. Because specific surface appears to correlate the lime characteristics better than any other test, it has been used as the primary means of evaluating a lime suspension. A rapid test for specific surface has been devised by removing 100 ml of the suspension and filtering on a Buchner funnel and washing with alcohol and ether. The dried sample will represent the particle size or specific surface of the solid in suspension. Specific surface is determined by a modified method with the Standard Blaine Air Permeability[2] cell and manometer. The dried residue can be used for any other testing. When the suspension has abnormal properties, which would indicate the necessity of determining the true specific surface, a larger sample than 100 ml will be required. Complete details of the method of test are given in Report 2-Ac.

The highest specific surface hydrate suspension can be made from a rotary kiln pebble lime with a ratio of surface area to volume within a defined range, as exhibited by special lime. The lime should be hydrated in water heated to or near the boiling point. Best results are obtained when the lime ratio is equivalent to 6—10 grams of hydrate per 100 cc of suspension.

★ ★ ★

A vigorous reaction between lime and water at 212°F should be expected, and precautions taken to protect personnel from lime-burn injury. Under these necessary precautions, no danger from the reaction should be anticipated. Further benefit is to be derived from the use of an adequate stirring device during the hydration process to keep the suspension in vigorous agitation.

★ ★ ★

Any unhydrated portion of the quicklime from such a method of hydration will settle to the bottom of the suspension tank. Plant tests of the method indicate no interference from it either by observing foreign material on the coated wire, on the dies or drawn wire.

★ ★ ★

It is recommended that further improvement of the suspension be made by providing a circulating pump for drawing a stream of suspension from the tank near the bottom of one side and reintroducing it below the surface of the suspension on the opposite side of the tank or providing an overflow at one end of the tank and pumping this suspension to the opposite side of the tank, introducing it near the bottom of the tank.[3] This suspension will be maintained in a well-mixed or agitated condition by this practice. The circulating pump will also act as a free-energy mill in further reducing the size of the particles by attrition.

★ ★ ★

It is important that a suspension of calcium hydroxide be protected from severe surface turbulence to reduce contamination to a minimum from carbon dioxide. If a circulating pump is employed, the discharge from the pump into the tank should be below the suspension surface to reduce any surface turbulence.

★ ★ ★

Based upon data obtained to the present time, a suspension satisfactory for good wire coating and drawing should contain calcium hydroxide having a specific surface of not less than 50,000 cm^2/g. A much higher surface should be sought since tests indicated that a surface of 80,000 cm^2/g is more ideal. When the specific surface of the hydroxide is less than 50,000 cm^2/g, it should be looked upon with suspicion and the cause for the reduction investigated.

Results of Laboratory and Plant Tests

Results of preliminary investigation reveal the following and this data is presented to indicate the progress made in hydrating and testing and to point out the importance of specific surface.

★ ★ ★

Shaft kiln and rotary kiln quicklimes have been hydrated in both cold water and boiling water to study the specific surface of the resulting hydrates. These results are tabulated as follows:

TABLE 3

Specific Surface of Hydrated Lime Suspensions From Shaft and Rotary Kiln Quicklimes

Lime	Water Temperature	Specific Surface cm^2/g
Shaft Kiln - A	Room	18,649
Shaft Kiln - A	Boiling	30,799
Shaft Kiln - B	Room	22,322
Rotary Pebble - A (Medium)	Room	38,993
Rotary Pebble - A (Medium)	Boiling	39,135
Rotary Pebble - B (Special)	Room	46,481
Rotary Pebble - B (Special)	Boiling	49,731

The increase in the specific surface of a commercial lime suspension, in use for several days and recirculated by a pump, is illustrated in the following typical example:

TABLE 4

Effect of Pumping a Suspension of Lime on the Specific Surface

Age of Suspension	Specific Surface cm^2/g
As prepared	41,245
One day	53,985
Two days	69,172
Four days	66,755

Another suspension showed a specific surface of 53,121 cm^2/g at the end of three days use. The specific surface can be maintained well above 50,000 cm^2/g by correct methods of hydration and agitation.

★ ★ ★

The specific surface alone may not be a good criteria of coating qualities, especially if the calcium hydroxide, during use, has changed in chemical constituents or in physical structure. These changes can be readily detected either by chemical analysis, settling rate data or by inspection of the dried residue for the presence of crystalline material. If the settling rate data or the filtering test show an abnormally slow rate it is certain to indicate that the suspension contains a colloidal form of $Ca(OH)_2 \cdot X\ H_2O$, or some other substance. Examples of suspensions containing colloids compared to a suspension of hydrate possessing ideal characteristics and indicating high specific surface are illustrated in the following tabulation:

TABLE 5

Settling Rate and Specific Surface of Normal and Colloidal Calcium Hydroxide Suspensions

Time Min.	Normal Suspension	Colloidal Suspension	
	Settling Rate - Volume		
5	94.0	98.2	98.0
10	90.0	97.8	96.5
15	88.0	97.0	94.5
20	85.5	97.0	93.5
30	79.0	96.0	92.0
40	73.5	95.3	90.0
50	68.5	94.5	90.0
60	64.5	94.0	89.0
90	58.5	92.0	86.0
120	51.5	90.5	83.0
	Specific Surface (cm^2/g)		
	49,731	47,328	59,504

The colloidal properties of the solid phase of the two samples could be easily detected by their gelatinous nature. When they are filtered by suction they require considerable time for removal of water and are difficult to wash and dry with alcohol and ether. The dried materials were observed to contain an appreciable quantity of crystalline material ranging in size from minute particles, which could be observed only by reflected light, to particles almost ¼ inch in length.

★ ★ ★

Suspensions of hydrated lime which become carbonated with use will generally have a settling rate equal to or less than normal hydrate, but the specific surface will be much less than calcium hydroxide because of the increase in true density. The specific surface of the solid from a sample of a commercial suspension was 36,790 cm^2/g and a qualitative test indicated the majority of the material to be calcium carbonate. The residue from this suspension, while of fairly high specific surface, would be inferior for coating. The coating would lack the proper adhering characteristics and thereby result in uneven covering on the wire.

★ ★ ★

Other characteristics of calcium hydroxides either in suspension or as a dried residue may be used in connection with this specific surface to detect abnormalities in selecting or using it as a wire coating. However, when the calcium hydroxide is not contaminated by chemical or physical changes, the specific surface can be used to control a dipping suspension.

★ ★ ★

Suspensions known to be contaminated by changes in composition should be discarded as useless or they should be investigated to determine if the poor characteristics can be improved.

Conclusions

Aqueous suspensions of calcium hydroxide for coating wire in the drawing process can be prepared best from rotary kiln pebble lime ranging from ⅛ inch to ⅜ inch.

★ ★ ★

This size rotary kiln pebble lime will produce a suspension containing calcium hydroxide with a specific surface greater than 50,000 cm^2/g. A particle size range exhibiting a limited variation in ratio of surface area to total volume of 24 to less than 100, as shown by the small size lime, is more ideal. Shaft kiln quicklime produces a hydrate with a specific surface of approximately 30,000 cm^2/g by the same process.

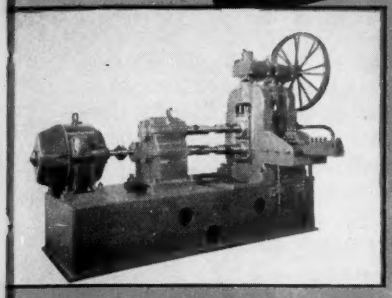
★ ★ ★

Pulverized quicklimes show fairly high specific surfaces for fresh lime, but the opportunity for contamination of small particles, during manufacture and storage, is not conducive to good coating characteristics. Pulverized quicklime with a specific surface of

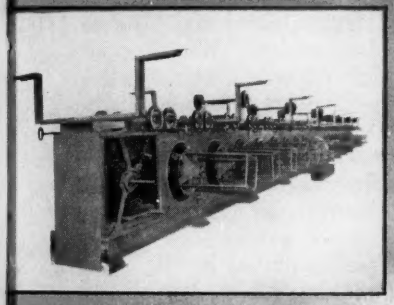
(*Please turn to page* 919)

LOOK TO Wean FOR WIRE MACHINERY

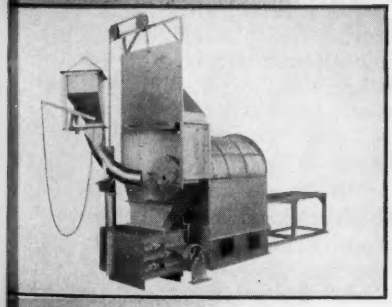
Process OR Product



2—Hi Wire Flattening Mill



Wire Galvanizing Take-Up Frame

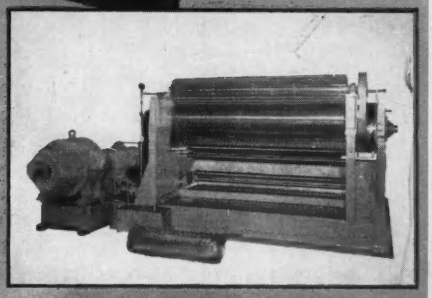


Nail Galvanizing Unit

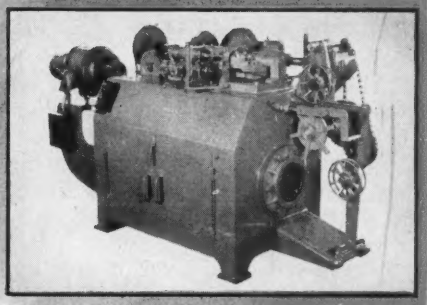
In the past few years tremendous progress has been experienced in the field of wire machinery. Production speeds have been tripled and quadrupled. Product quality has been greatly improved. Machines have been made easier to operate and maintain.

The Wean Equipment Corporation has been a large contributor to this advancement. Wean wire mill specialists have designed, built, and installed wire mill equipment for the leading wire producers the world over. If you make wire you should look to Wean for the best in machinery, service, and facilities.

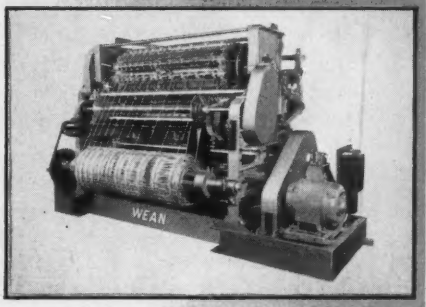
STRIP MACHINERY



Hexagon Netting Machine



2 or 4—Point Barbed Wire Machine



Hinge — Joint Fence Machine

Wean Equipment Corporation
CLEVELAND, OHIO

Quality—A Combination of Horsesense and Statistical Methods

by C. Kenneth Hamlin
Quality Control Department
Rome Cable Corporation
Rome, New York

A paper delivered on December 14, 1953, at the Signal Corps Wire and Cable Symposium in Asbury Park, N. J., and published here through the courtesy and by permission of the author and his company.

As competition increases, and the need for manufactured goods decreases because the supply has nearly satisfied the demand; we, as manufacturers, are more and more interested in finding some way of making our product more attractive to consumers. At the same time, we want to increase the realibility of service of our product.

★ ★ ★

One characteristic that satisfies these requirements is maximum Quality. This little gem sometimes costs practically nothing and yet can be most attractive. It is also true that in many cases the higher the Quality, the higher the costs. Recognizing this, a decision must be made as to the most practical and economic level of Quality desired.

★ ★ ★

To illustrate—consider the eraser on an ordinary lead pencil. One that will perform efficiently, and last for the life of the pencil for the average user, is good quality. However, if, in the hands of the same writer, it wears out before the pencil, it is of poor quality. Likewise, what good is one that shows little wear after the pencil is no longer usable? In other words 'Controlled Quality' is something to be desired, but at the most practical and economic level.

★ ★ ★

I believe consumers feel the same way. They do not want to pay a premium price for a quality level that is not justified by added benefits to them.

It is necessary then, that we first use good judgment in setting Quality standards. For the end product, our judgment will be based on good engineering and a careful study of the need.

★ ★ ★

The other quality problem faced is—How do we go about controlling the three M's (Men—Material —Machines) so that we can achieve and maintain the desired quality level effectively?

★ ★ ★

During the past several years there has been much bally-hoo about a wonder technique called Quality Control. Just for the record, let's agree here and now that Quality Control is not something that can be bought by the pound or a decree that is issued by the front office.

★ ★ ★

Quality Control, then, to use a common name for a new method of approach to inspection functions, is really an application of theories long ago accepted and proven. Quality Control engineers make effective use of the laws of chance that are the basis for many games, such as dice, etc. Quality Control engineers have also been able to devise new and more usable methods for the reporting and analyzing of data.

★ ★ ★

So far, we have considered Quality Control as an engineering science—it is even more than that. To be successful, the Quality Control system, or plan, in any operation must have the complete cooperation and interest of the operator. This is the point I would like to enlarge on in this discussion.

★ ★ ★

Perhaps the most helpful way to discuss this subject would be to report some of our actual experiences, but before doing that, I would like to digress for a moment.

★ ★ ★

A century ago, most 'manufacturing' operations were one man affairs. A carpenter or cabinet maker, for example, in the business of making tables, very likely owned and felled the trees for lumber. He probably cut, cured, and dressed into finished lumber the materials he himself was to use. With these materials he designed, produced and sold his product.

★ ★ ★

This craftsman knew nothing about Quality Control, but did he think Quality? Without a doubt he did, because he realized that if his product wasn't as good or better than his neighbor's, his chances of making a sale were slim.

★ ★ ★

Even in the preliminary stages of his operation, he no doubt was constantly on the alert to sort out any material that was likely to be the cause for scrap or poor product later on.

The point is—With this craftsman, the responsibility for Quality rested squarely on his shoulders and he knew it. As a result, he probably achieved a type of Process or Quality Control that since has never been equaled.

★ ★ ★

Unfortunately perhaps, the situation today is quite different. For example, it is not uncommon today that an operator or even a production unit has no knowledge whatever regarding the ultimate use of his product. Today, those of us who make components such as small parts, screws, hook-up wire, etc., or other items to be assembled in a larger unit later on, do not always fully understand the ultimate use of our product. True, we manufacture to a specification, but not always do we have that intimate knowledge or understanding that can be so valuable.

★ ★ ★

To return to our present discussion, I believe the Quality administrator has a very distinct and clear responsibiiity to production personnel. He must make it his business to learn as much as possible about the ultimate use of the product and somehow communicate this information to the men producing.

★ ★ ★

The most common and accepted method, of course, is to write a specification stating what is o.k. and what isn't. This is the easy way, and if the process is capable, the result will be just that—parts that are o.k. and some that are not. The question now arises how much better **could** the parts that are acceptable have been made? Further, if these parts were made better, or of higher Quality, would it have cost more? The surprising thing, perhaps, is that in many cases, a higher Quality product can be obtained at practically no cost.

★ ★ ★

To cite an example—One of the products we are currently producing for the Signal Corps Supply Agency is a special type of communications cable called Spiral Four Cable. This cable has many critical requirements, not the least of which is the capacitance unbalance requirement.

★ ★ ★

The capacitance unbalance of this cable is expressed as side-side capacitance unbalance and side-ground capacitance unbalance. It is extremely important that both of these values be kept low because of their effect on crosstalk and noise when the cable is in use.*

★ ★ ★

Also fewer repeators or amplifiers are needed in long circuits if the average side-side and side-ground capacitance unbalance is low. For Spiral Four Cable, the specification limits for averages for side-side and side-ground are 20 mmf. and 450 mmf. respectively. For simplicity, we will discuss side-ground capacitance unbalance only.

★ ★ ★

After considerable work and patience, we were able to consistently produce cable that averaged 115 mmf. for side-ground capacitance unbalance. From various experiments and close observation, however, we knew that the process was capable of better performance with regard to side-ground capacitance unbalance.

★ ★ ★

Our first attempts were directed toward the best possible control of the cable dimension—wise. This was logical because capacitance unbalance is in part a measure of the geometry of the cable.

★ ★ ★

For an extended period, data was gathered from each of the processes involved and plotted. Our method for plotting and observing this data, while perhaps not the most efficient, was the application of simple frequency tabulations. (See Figure 1.) If recorded in a neat and orderly manner, tabulations of this kind can be very helpful in process observation. Another very great advantage that a tabulation of this kind has, is its 'built-in' ability to present the average and spread of a collection of data. The average production supervisor can understand average values readily enough, but often has difficulty trying to use and think in terms of 'standard deviation' or even 'range' in some cases. With this type of chart, however, the spread is presented visually and consequently is easy to interpret.

FREQUENCY TABULATION
SCORING SHEET

CELL LIMITS		FREQUENCY
80 — 85	I	1
75 — 80	II	2
70 — 75	III	4
65 — 70	𝍸	10
60 — 65	𝍸 II	17
55 — 60	𝍸 𝍸 III	29
50 — 55	𝍸 𝍸 III	23
45 — 50	𝍸 II	13
40 — 45	𝍸	8
35 — 40	III	3
30 — 35	I	1
25 — 30	I	1
	TOTAL	112

Fig. 1.

★ ★ ★

It soon became apparent that one of the causes for this undesirable variation in capacitance unbalance values was the cabling process.

★ ★ ★

The cabling department is composed of six machines with three operators each running two machines. The process itself consists of twisting four insulated conductors around a core.

★ ★ ★

Since we were now focusing our attention mainly on this process, the method of plotting data was altered so that the performance level of each pair of machines could be observed. As can be seen in Figure 2, we soon discovered that each pair of machines was producing at a different level. In terms of side-ground capacitance unbalance, the production of operator A was averaging approximately 78, B —144, and C—114. The apparent skewness of these tabulations is a result of our method of recording test data. The actual results of this test in terms of capacitance unbalance are positive or negative values. We do not record the signs, hence the skewed shape of this distribution. Studies have shown that there is an equal distribution of positive and negative values. This means, of course, that if we were to regard signs, a double hump curve would result since zero capacitance unbalance would be lo-

* (For a more complete discussion on this subject, refer to a paper given by A. G. Chapman at the 1952 Symposium entitled "How Crosstalk and Noise Affect Capacitance Unbalance in Spiral Four Cables").

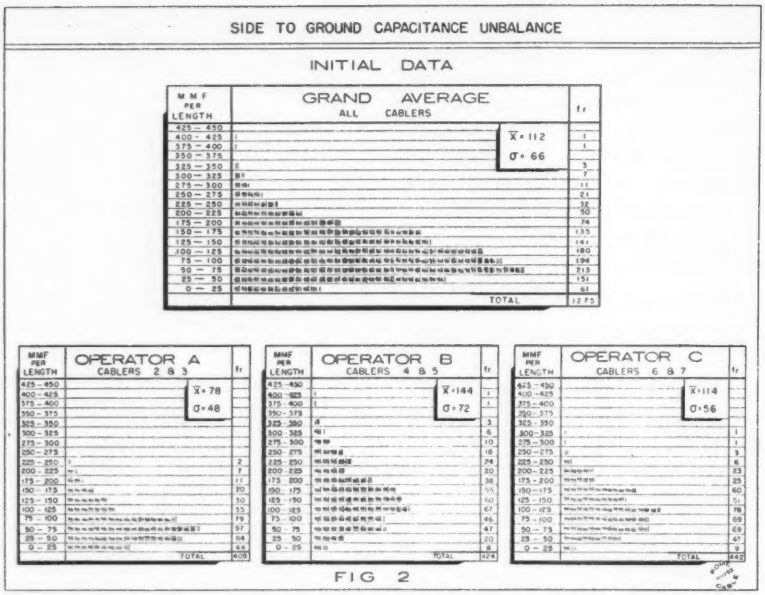


FIG 2

cated in the middle of the distribution.

★ ★ ★

The immediate thought, of course, was; is there a difference between the cabling machines? Secondly; is there any difference in the materials supplied the machines? Careful investigation proved that there was little, if any, reason to suspect the machines or the materials as being the cause of this variation. This, of course, leaves us with only one suspect . . . . . Men.

★ ★ ★

This presented quite a problem; since these machines are more or less automatic it was difficult to visualize the men as an influence. The machines are loaded with four supply spools of insulated conductor and one spool of core and run until a fresh set-up is needed. About the only thing we knew about the running characteristics of these machines, as a result of previous experiments, was that the braking tensions controlling the supply spools of insulated conductor should be uniform and light. To this end, we had previously exercised great care in equipping these machines with uniform tension belts and springs. In fact, we had tried just about every trick that we could think of. To confess—we were stumped.

★ ★ ★

This being the case, we decided to take the problem directly to production and the operators themselves. This was done, and at a meeting with the operators we carefully explained our problem to them and again acquainted them with our objectives. All of the data we had thus far collected on the process, including our charts showing the differences between operators, was shown them and explained. When this was done, we asked for their ideas.

★ ★ ★

The reaction of these men was all that we had hoped for. They were impressed by the importance of the job they could do and promised complete cooperation. One of the first things they asked for was a control chart near their machines so that they could follow the trend of capacitance unbalance results themselves. They also asked that they be allowed to initiate experiments, with our approval, when they felt that they had a sound idea. To this end we agreed to expedite any experimental runs that were made. They also asked that during the trial period we confine our inspection activities to product inspection and leave the process control entirely in their hands.

★ ★ ★

The results of this experiment can best be shown by the following charts. Figure 2 clearly shows the difference in performance of each operator. When this condition was observed by the operators, they asked that they be shifted to other machines to see if the machines were responsible. Figure 3 shows that the same pattern followed an operator regardless of the pair of machines he was running.

★ ★ ★

At this point, one operator (whom we shall call operator B) asked that he be assigned to other work. He felt that he had been doing his best and was not capable of better performance. His supervisor felt differently and used this advantage to call another meeting. The result was, the best operator

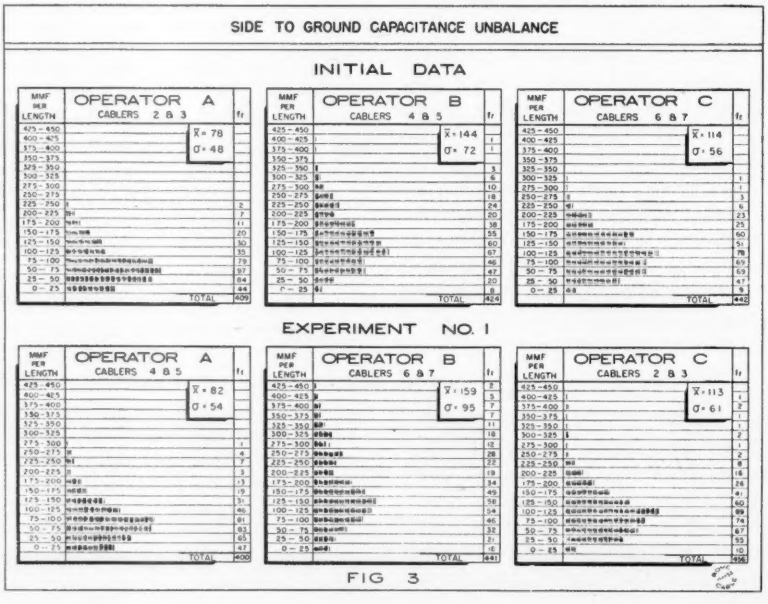


FIG 3

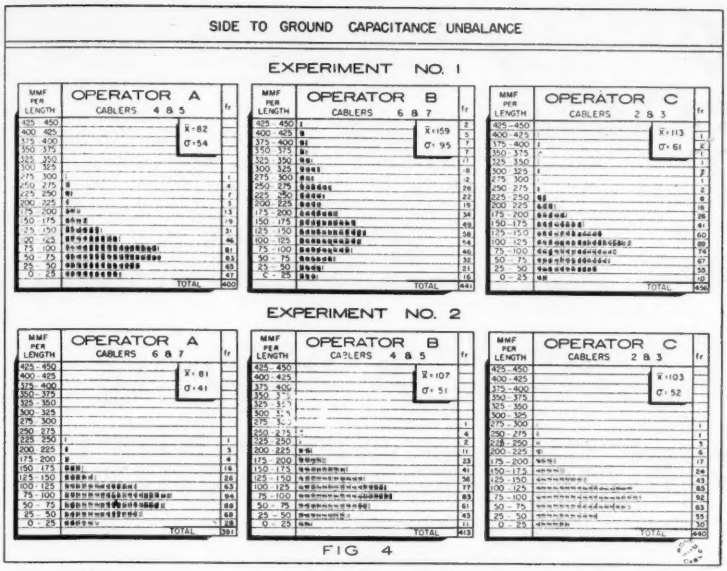


FIG 4

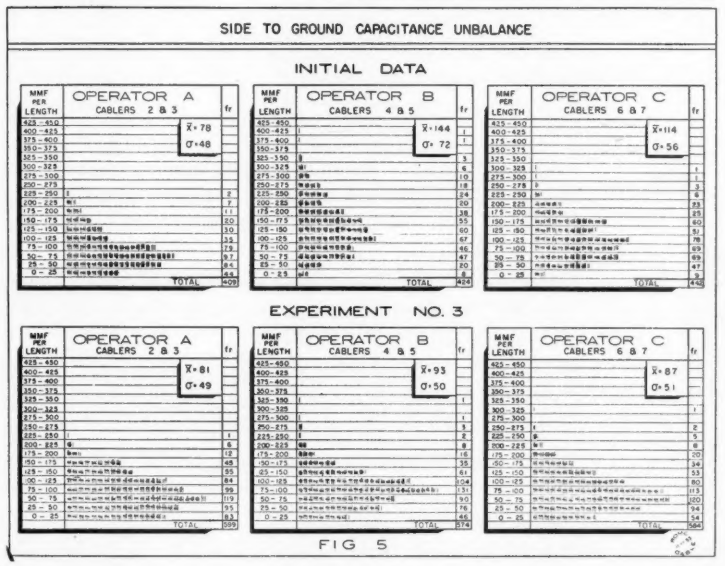


FIG 5

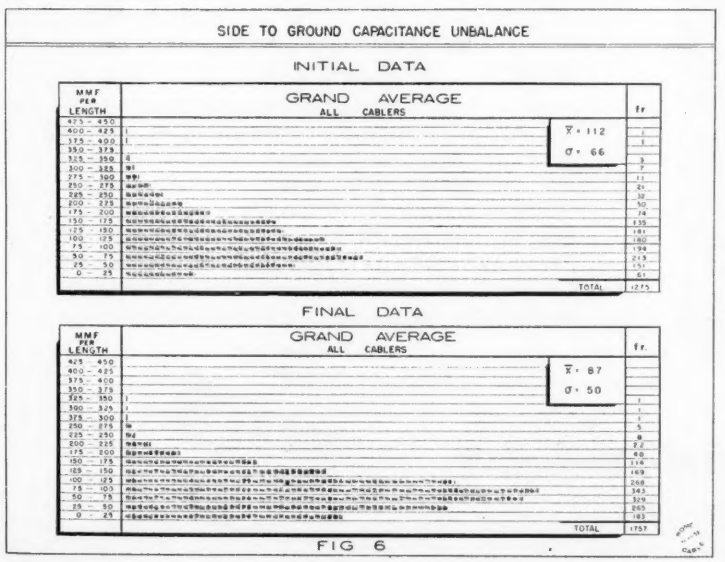


FIG 6

(operator A) agreed to work with this man in an effort to help him improve. This paid off as shown on Figures 4 and 5. From this point on, improvement was steady and the average capacitance unbalance values were running to a uniformly lower average of 87 mmf. for side-ground. (See Figure 6.) Aside from the improved quality achieved from this experiment, the Technical Department has acquired considerable 'know how' with regard to the proper operation and capabilities of the cabling process.

★ ★ ★

Probably more for sentimental reasons than anything else, the operators have since returned to their original machines. Although the tempo of our experiment has decreased, we do not consider our job finished. We are still maintaining the charts at the machines and both production supervision and the operators are very jealous of the record they are making.

★ ★ ★

Again I would like to point out the fact that nowhere in this experiment did we introduce, except perhaps in the office, what might be called complicated statistical procedures. We did make effective use, however, of simple Quality Control methods for the recording and reporting of performance data.

★ ★ ★

As a result of this experiment it has been proven, and forcibly demonstrated, that the ability of the man on the machine cannot be underestimated. Further, the best engineering and planning will often fall short of the goal if the Men are not considered. To quote a good axiom "Quality cannot be inspected into a product, it must be built in".

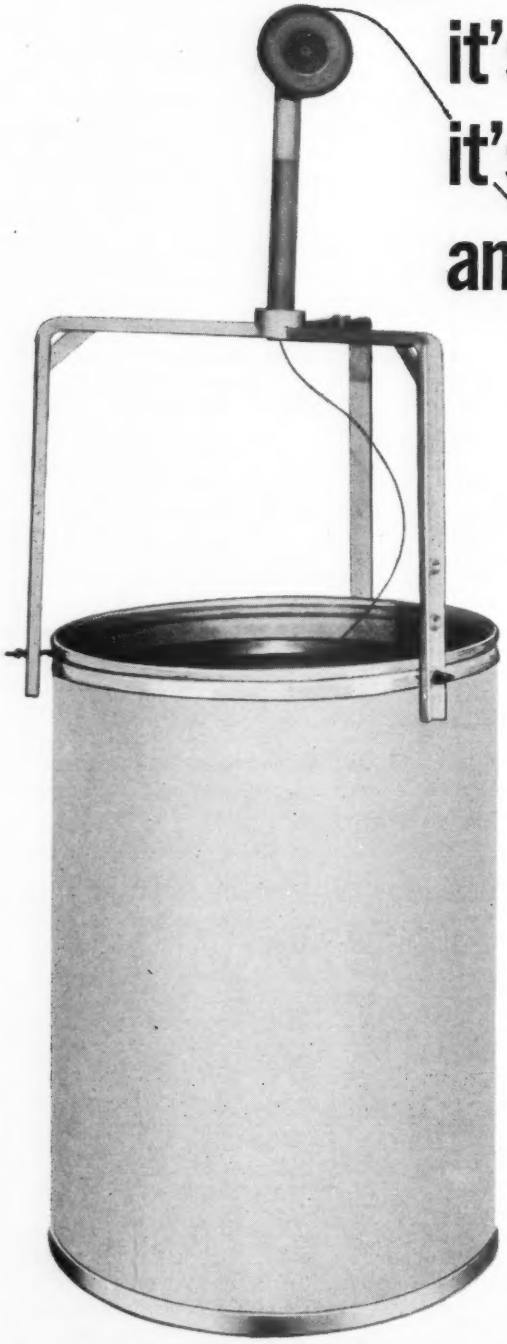
★ ★ ★

Stated another way— the operator performing a simple machine operation is many times given only a set of go and no-go gauges, or their equivalent, with which to judge his work. His assignment, therefore, is to produce parts that will pass his gauges. With this situation it is possible that parts

(*Please turn to page* 917)

Payoffpak...

it's new...it's different... it's ideal for handling and processing WIRE!



PAYOFFPAK—Continental's newest fibre container—offers wire manufacturers and fabricators a revolutionary new development in wire packaging, handling and dispensing.

SAVES WORK—Wire is automatically packaged in the Payoffpak as it is drawn, eliminating such operations as stripping, tying, handling, splitting and wrapping.

SAVES TIME—Payoffpak can hold 600 lbs. Downtime on the wire drawing machine, due to stripping operations, is greatly reduced.

ELIMINATES REELS—Single standard-size Payoffpak eliminates reels and need for wide range of block sizes.

CUTS SHIPPING COSTS—Inexpensive, light-weight Payoffpaks travel for less because of extremely light tare weight.

HANDLES AND STACKS EASILY—In-plant handling of Payoffpaks is easy with conventional hand trucks. High stacking strength means you can use maximum storage space, too.

A survey indicates that often more than 50 labor steps are needed to convert 500 pounds of steel wire in standard eight inch coils—but you can do the same job with Payoffpaks in an average of five operations. No wonder they are calling this new container "the long-playing record of the wire industry" See how Payoffpaks can pay off for you. Call Continental for complete information on this exciting new way to package, handle and dispense wire.

CONTINENTAL CAN COMPANY

FIBRE DRUM DIVISION • VAN WERT, OHIO

New York • Philadelphia • Pittsburgh • Tonawanda • Cleveland • Chicago
Atlanta • St. Louis • San Francisco • Los Angeles • Eau Claire

Wire Flattening — An Appraisal of Today's Theory and Practice

by A. I. Nussbaum
Rolling Mill Division
Stanat Manufacturing Co.
Long Island City, New York

Part I—Wire Flattening Theory

Part I of this article reviews the theory underlying the wire flattening process and provides convenient methods of determining spread, wire size and mill power requirements. In Part II is described the design and operation of mill equipment used in modern wire flattening practice. Part II will be published in September.

Today's growing demand for narrow metal strip held to extremely close size tolerances has led to increasing applications of the wire flattening process. Manufacturers of such precision products as hair springs, slide fasteners, resistance elements and electronic tube components have realized that flat wire stock offers many advantages which cannot be obtained from ribbon stock slit from wide strip. To name only a few of these benefits:

(A) Closer thickness and width tolerances;
(B) Improved edge shape;
(C) Reduced strip camber;
(D) Smoother surface finish; and
(E) Availability of both traverse-wound spools and pancake-wound coils.

★ ★ ★

While much research work is at present going on in the field of strip rolling, the more specialized case of wire flattening has been rather neglected. Sooner or later, every producer of flat wire is faced with the problem of determining the starting gauge of round wire required to roll a given cross-section of flat wire on an available mill. The first part of this article reviews this particular problem and provides an easy graphical solution to it. Furthermore it derives a simple formula for determining power requirements in flattening work. In the second part, the design and operation of the modern wire flattening mill is discussed.

Spread in Strip Rolling

It is now well known that besides being elongated, strip metal is widened in the process of being reduced in thickness when passing between the rolls of a cold strip mill. In the rolling of wide strip, the effect of this so-called spread is relatively unimportant. However, as the ratio of strip width to thickness decreases, the spread becomes more and more noticeable. As this ratio reaches a value of 6:1 or less, the spread generally becomes so large that it has to be allowed for whenever the finished section is required to have a closely held width or when it is necessary to determine accurately the strip elongation resulting from a given pass reduction.

★ ★ ★

Although spread is the very property which makes possible the wire flattening process, it is considered rather a nuisance by the operating men in the strip and sheet rolling mills. In narrow strip mills, the presence of spread leads to a non-uniform pressure distribution across the width of the strip, giving rise to a tensile stress in the edge of the strip. In the case of brittle materials, this stress may lead to cracks forming in the strip edges and, ultimately, to strip breakage. Even in the wider strip mills, there still is a tendency for spread to occur, although on a much reduced scale. Nevertheless, many operators feel that it is this spread which is responsible for the strip gauge being "light" toward the edges.

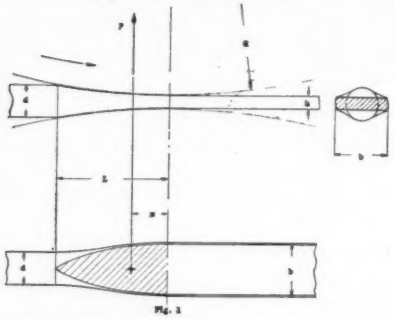
★ ★ ★

It has been found that in strip rolling spread can be reduced by the use of work rolls of smaller diameter, and this is one of the advantages gained by employing four-high rather than two-high strip mills. Furthermore, by "crowning" the work rolls of the strip mill it is now possible to obtain almost perfect gauge uniformity across the width of the material, resulting in the production of flat strip free of buckles or waves. Finally, the relatively high front and back tensions applied in modern cold strip mills provide an additional means of controlling spread. Employing tensions equivalent to ⅓ to ½ the yield stress of the material, it has been found possible not only to reduce the spread to zero but actually to make it negative. Thus, when reducing strip in the twelve-high and twenty-high Sendzimir cluster mills with extremely small diameter work rolls and comparatively high tensions, the final strip width is generally slightly less than the starting width.

Spread in Wire Flattening

In wire flattening the greatest amount of spread is obtained in the initial pass when the round wire is reduced to a flat cross-section. Subsequent passes, taken either by re-running the flat wire through the same mill stand or by

feeding it through the successive stands of a tandem mill, mainly serve to decrease the stock thickness while contributing relatively little further increase in width. Fig. 1 indicates the basic distribution of spread in the case of the single-pass reduction of a round wire to a flat section between the rolls of a two-high mill.



★ ★ ★

In calculating the diameter of round wire required to produce a given width and thickness of finished flat wire, probably the oldest "rule-of-thumb" formula is:

$$d = \frac{b + h}{2} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1),$$

where d=diameter of round wire, in.
b=width overall of flat wire, in.
and h=thickness of flat wire, in.

In 1926 Davies* published details of wire flattening tests conducted mainly on 10 in. diameter two-high mills at speeds of 75 and 104 f.p.m. He flattened wires of low carbon steel and copper ranging in diameter from 0.072 in. to 0.500 in. in single passes with thickness reductions ranging from 7 to 62.5 per cent. An analysis of his results shows that the perimeter of the flat strip after the pass to the perimeter of the round wire before the pass is reasonably constant. This ratio has been termed K, where:

$$K = \frac{2\,(b+h)}{\pi\, d} \quad \ldots\ldots\ldots\ldots \quad (2)$$

★ ★ ★

Realizing that for a thickness reduction range of about 10 to 50 per cent, the value of K departs only little from 1.2, Davies proposed the following wire flattening formula:

$$d = \frac{2\,(b+h)}{\pi\, K} = 0.53\,(b+h) \quad . \quad (3)$$

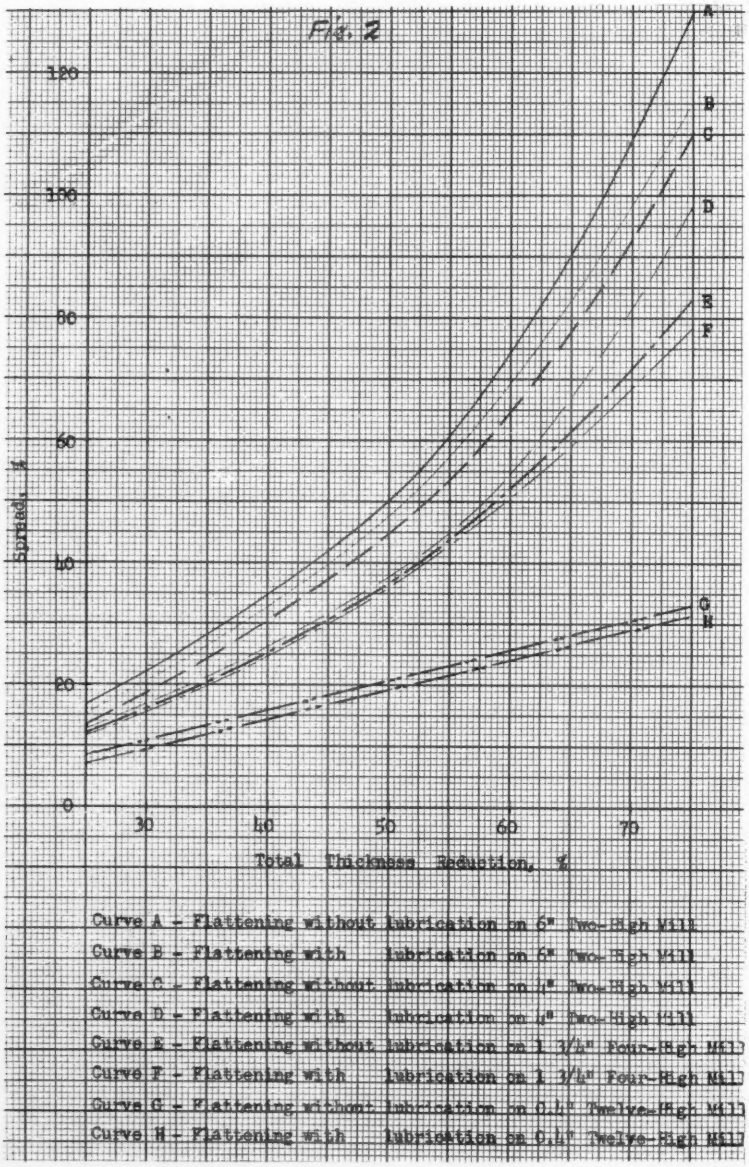
★ ★ ★

A more comprehensive series of wire flattening tests were conducted by Pomp, Hoehle and Lueg + at the Kaiser Wilhelm Institut fuer Eisenforschung in Duesseldorf, Germany, in 1938. In particular, this work resulted in much valuable information concerning the effect of the roll diameter on the amount of spread obtainable. The major tests involved two high carbon electric furnace steels "A" and "B", four wire diameters, four roll diameters and four types of metallurgical structure. The analysis of the steels A and B were as follows:

	C%	Si%	Mn%	P%	S%
A:	1.11;	0.30;	0.52;	0.024;	0.006
B:	0.83;	0.22;	0.60;	0.029;	0.012

★ ★ ★

The wire diameters were 3 mm (0.12 in.); 2 mm (0.08 in.); 1 mm (0.04 in.); and 0.5 mm (0.02 in.). The machines used for the tests were two two-high mills having rolls of 6 in. and 4 in. diameter, respectively, a four-high mill with



* C. E. Davies, THE ENGINEER, June 11, 1926, p. 598.
+ A. Pomp, H. Hoehle and W. Lueg, STAHL UND EISEN, Sept. 1, 1938, p. 937.

1¾ in. diameter work rolls and a twelve-high Rohn cluster mill with 0.4 in. diameter work rolls. The reductions were performed without either front or back tension and both dry and with the application of a bone oil lubricant. The reductions per pass were generally of the following order:

Pass No.:	1	2	3	4	5
Thickness Reduction, %:	25.0	26.7	27.3	25.0	16.7

equivalent to a total reduction of 75 per cent.

★ ★ ★

The effect of lubrication and the roll diameter on the amount of spread obtainable is illustrated by the graphs reproduced in Fig. 2. All of these curves apply to wire of 1 mm diameter having a globular cementite structure and having been cold-drawn prior to flattening to obtain a tensile strength of about 130,000 p.s.i. It may be concluded from these graphs that (a) the spread obtainable in wire flattening increases with the roll diameter and (b) the use of a rolling lubricant decreases the spread, particularly at the higher reductions and when using rolls of relatively large diameter.

★ ★ ★

Based on the results of these tests, the chart reproduced in Fig. 3 has been prepared to provide the mill operator with a simple means of determining accurately the diameter of round wire required to produce a flat wire section of given width and thickness, with allowance being made for the diameter of rolls to be used. Instead of being based on actual physical dimensions, the graph has been plotted using ratios of final width to final thickness as ordinates and percentage ratios of final thickness to roll diameter and wire diameter to roll diameter as abscissae. This procedure is based on the fact that, in wire flattening, geometrically analogous rolling conditions will yield geometrically analogous rolling results. The use of such a chart thus makes it possible to allow for the influence of the roll diameter—an influence not taken into consideration by the formulae (1) and (3) discussed earlier.

★ ★ ★

The method of using the chart is perhaps best illustrated by the following examples relating to the multiple-pass flattening of 0.188 in. diameter high carbon steel which were confirmed by actual rolling tests.

★ ★ ★

EXAMPLE I: Required to produce 0.050 in. x 0.318 in. flat wire on a 6 in. diameter mill. Determine starting wire size.

★ ★ ★

HERE b/h=0.318/0.050=6.4
and h/D=0.050/6 =0.0083 or 0.83%

★ ★ ★

DRAW a horizontal through 6.4 on the b/h scale and a vertical through 0.83 on the h/D scale. Through their point of intersection, draw a line parallel to the nearest inclined-angle line down to intersect the horizontal d/D scale. Reading off the value on the horizontal scale, d/D is found to be 3.2%. Hence, the required starting wire size d is 3.2% of D, or 0.032 x 6=0.192 in. In actual production, 0.188 in. diameter wire was used, indicating an error in calculation by this method of only 2 per cent.

★ ★ ★

EXAMPLE 2: Required to flatten 0.188 in. diameter wire to a final thickness of 0.050 in. on a 2¾ in. diameter mill. Determine final width.

★ ★ ★

HERE, h/D=0.050/2.75=0.018 or 1.8%
and d/D=0.188/2.75=0.068 or 6.8%

★ ★ ★

DRAW a vertical through 1.8 on the h/D scale. Draw a line parallel to the nearest inclined-angle line through 6.8 on the d/D scale. Through their point of intersection, draw a horizontal to intersect the vertical b/h scale. Reading off the value on the verticle scale, b/h is found to be 5.4. Hence, the final width of flat wire b is 5.4 x h or 5.4 x 0.050= 0.270 in. In actual production, the width was found to be 0.265 in., indicating an error in calculation of less than 2 per cent.

★ ★ ★

EXAMPLE 3: Required to flatten 0.188 in. diameter wire to obtain a 0.050 in. x 0.350 in. flat wire section. 10 in., 8 in. and 6 in. diameter mills are available. Determine which of these is to be used.

★ ★ ★

HERE, b/h=0.350/0.050=7
and, trying D=10, h/D=0.050/10=0.005 or 0.5%.

★ ★ ★

DRAW a horizontal through 7 on the b/h scale and a vertical through 0.5 on the h/D scale. Through their point of intersection, draw a line parallel to the nearest inclined-angle line down to intersect the horizontal d/D scale. Reading off the value on the horizontal scale, d/D is found to be 1.9%. This confirms the 10 in. roll diameter choice, since starting wire size d=0.188 in., or 1.88% of D.

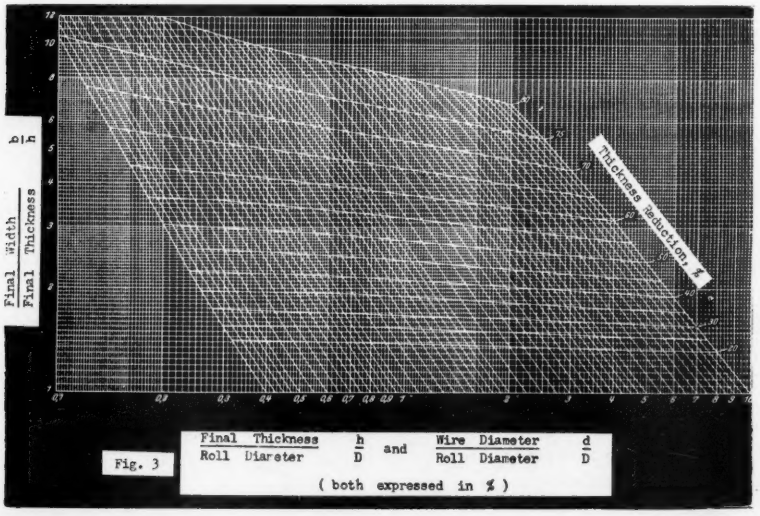

b/h
Final Width / Final Thickness
Thickness reduction %
Final Thickness / Roll Diameter h/D and Wire Diameter / Roll Diameter d/D
(both expressed in %)

Fig. 3

Power Requirements in Wire Flattening

In selecting a mill to perform certain flattening work, it is often necessary to determine the approximate horsepower requirements involved. In the interest of keeping the calculations relatively simple, the following method of analysis assumes rigid, undeformed rolls and ignores the effects of front and back tensions.

★ ★ ★

With reference to the roll bite illustrated in Fig. 1, let:

P=rolling force, lb.
p=specific rolling pressure, lb. per sq. in.
A=projected contact area between flattened wire and rolls, sq. in.

(*Please turn to page* 916)

Natural Aging of Neoprene Jacketed Telephone Drop Wire

by R. H. Dudley, Chief Chemist
and
C. A. Larson, Rubber Chemist
Whitney Blake Company
New Haven, Connecticut

This paper was presented at the Second Annual Signal Corps Wire and Cable Symposium at Asbury Park on December 14, 1953, and is published here by permission of the authors.

Telephone drop wire is the outside wire connecting the open wire or cable and the subscriber's station in the telephone system. The first telephone drop wire was uninsulated bare copper wire which was supplanted early in the century by rubber insulated wire having an outer cotton braid covered with wax-like material. Subsequent development led to impregnating the cotton braid with asphalt and covering with pitch and flaked mica for weather resistance. As the technology of rubber advanced the stability of the rubber insulation improved, so long as the weatherproofed braid protected it from atmospheric elements and light. One limiting factor in the life of drop wire then became this weather-proofed cotton braid. On prolonged exposure to weathering, the mica, pitch, and asphalt eroded, the cotton tendered and fell away, leaving the rubber insulation unprotected from light and atmospheric conditions. Figure 1 illustrates this stage of deterioration.

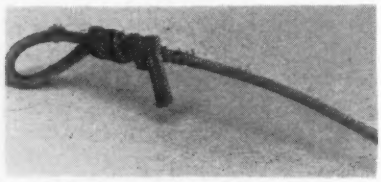


Fig. 1—Weatherproofed Wire Nine years weathering.

Soon the rubber insulation cracked, resulting in service disruption whenever the wire became wet and ultimately in complete failure of the drop. Average life for this wire was considered to be in the neighborhood of seven years, but varied widely depending on geographic location of installation.

★ ★ ★

In the early 1930's considerable effort was being devoted to improving the outer covering on drop wire. It was during this same period that neoprene was being introduced commercially. Along with its other properties, vulcanized neoprene was found to have good resistance to deterioration on exposure to sunlight; this fact was noted by E. R. Bridgwater (1) in 1939. E. D. Youmans (2) in 1941 reported excellent stability of neoprene to weathering as a jacket material for wire and cable on outdoor exposure of five years. It was natural that neoprene be considered as a possible outer covering to replace the weatherproofing to extend the useful life of drop wire.

★ ★ ★

Experimental neoprene jacketed drop wire was first produced by the Whitney Blake Company in 1944. Some commercial production was achieved late in 1944. Shortly after conclusion of World War II and late in 1945, regular production began. Neoprene jacketed drop wire rapidly received broad enthusiastic acceptance by the telephone industry and during the last decade several billions of feet of it have been put into service.

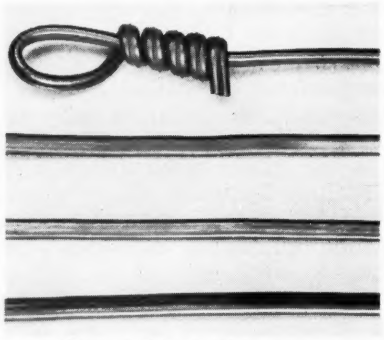


Fig. 2—Effect of Natural Aging:

A. Nine years weathering.
B. Same wire, shelf aged.
C. Eight years weathering.
D. Seven years weathering.

In 1944 this early neoprene jacketed drop wire was installed in a span similar to a drop in an exposed location on the roof of the Whitney Blake Company near New Haven, Connecticut. The weatherproofed drop wire shown in Figure 1 was installed similarly at that time and provides a reference control. This and subsequent similar test samples provide opportunity for direct study of natural aging of neoprene jacketed drop wire.

★ ★ ★

The oldest length has been exposed to natural weathering for over nine years; it was strung up on July 20, 1944 and removed for this examination on October 19, 1953. This wire is a #17 AWG wire, having 1/32 inch wall of GR-S insulation and directly over

two parallel insulated conductors, a neoprene jacket of approximately 1/32 inch wall. The neoprene jacket is essentially unchanged in appearance, shows no cracks, and has retained flexibility. Figure 2—A & B pictures a shelf aged specimen of this wire, and a roof aged specimen wrapped around its own diameter. Table I gives data on electrical parameters measured prior to aging in 1944 and subsequent to roof aging.

TABLE I

ELECTRICAL MEASUREMENTS
BEFORE AND AFTER NATURAL OUTDOOR AGING
July 20, 1944 to October 19, 1953

	ORIGINAL	AGED
1. Insulation Resistance Megohms—Thousand Feet	3500	Over 10,000
2. Capacitance Conductor to Conductor Micromicrofarads Per Foot	29.5	27.4
3. Capacitance Conductor to Ground Micromicrofarads Per Foot	67.2 65.5	71.9 70.5

1. Measured conductor to ground after 12 hours immersion in water at room temperature and corrected to 60°F Aged value measured on 115 foot length.
2. Measured dry and at room temperature.
3. Measured after 24 hours immersion in water at room temperature.

A sample length of neoprene jacketed drop wire from first commercial production was installed on March 27, 1945, and removed for this examination on October 19, 1953. This wire is #20 AWG wire having 1/32 inch wall of GR-S insulation and directly over two parallel insulated conductors a neoprene jacket of approximately 1/32 inch wall and it is shown in Figure 2—C. As in the case of the older wire, there is no visible evidence of deterioration. Physical and electrical test data obtained on this wire at the time of manufacture and on the sample length after roof aging are shown in Table II.

TABLE II

PHYSICAL AND ELECTRICAL TEST DATA
BEFORE AND AFTER NATURAL OUTDOOR AGING
March 27, 1945 to October 19, 1953

	ORIGINAL	AGED
1. Compression Resistance—Lbs.	1300	1200
2. Cold Bend at −40°C.	No cracking of jacket	No cracking of jacket
3. Insulation Resistance Megohms—Thousand Feet	4500	Over 10,000
4. Capacitance Micromicrofarads Per Foot	69 5	63.5

1. Measured on one conductor of finished wire, prepared by slitting wire between conductors and using 1 inch jaw.
2. One hour exposure and subsequent wrap around ¼ inch mandrel.
3. Measured conductor to ground after 12 hours immersion in water at room temperature and corrected to 60°F. Aged value measured on 105 foot length.
4. Measured conductor to ground after 24 hours immersion in water at room temperature.

On February 4, 1946, a sample length from current production was installed as a roof test span and was removed for test on October 19, 1953. This wire is #17 AWG bronze with a 1/32 inch wall of GR-S insulation, having an open braid of number 30 two ply cotton yarn over two parallel insulated conductors and with an overall neoprene jacket of approximately 1/32 inch (See Figure 2—D). The construction of this wire makes possible separation of jacket from insulated conductors permitting more detailed examination than is possible on the wires previously described. Physical and electrical test data on this type of wire at time of manufacture in 1946 and on the aged sample are given in Table III.

TABLE III

PHYSICAL AND ELECTRICAL PROPERTIES
BEFORE AND AFTER OUTDOOR AGING
February 4, 1946 to October 19, 1953

	ORIGINAL	AGED
1. Compression Resistance Finished Wire—Lbs.	1200	1680
2. Compression Resistance Insulated Conductor—Lbs.	1150	1130
3. Jacket Tensile Strength—P.S.I.	2140	2500
4. Jacket Elongation—%	230	100
5. Jacket Brittleness Temperature °C.	−32	−25
6. Insulation Resistance Megohms—Thousand Feet	3800	Over 10,000

1. Using ½ inch jaw.
2. Using 2 inch jaw.
5. On impact producing 45° bend.
6. Measured conductor to ground after 12 hours immersion in water at room temperature and corrected to 60°F Aged value measured on 125 foot length.

No significant change as a result of the agings is shown by the above data in any characteristics measured with the exception of jacket elongation. Visual examination of the wires and measurements of adhesion of insulation to conductor, conductor tensile strength and conductor electrical resistance likewise show no evidence of deterioration as a result of the agings. It appears then that the neoprene jacket has effectively protected the insulated conductors from weathering effects and done so without introducing any factors deleterious to the insulated conductors.

★ ★ ★

Changes have occurred in the neoprene jacket, however, particularly in reduction in elongation at break. G. N. Vacca (3) and his associates have discussed aging of black neoprene jackets noting that such jackets on outdoor aging do show considerable loss in elongation in relatively short periods. They found that elongation tends to level off and change more slowly on continued exposure. Figure 3 shows data obtained showing rate of change of elongation of the jacket on the wire exposed since February 4, 1946; this indicates the tendency towards rapid change initially followed by a reduction in rate of change similar to that found by G. N. Vacca. Jacket elongation in the order of ten percent is probably adequate for drop wire in service; therefore, it seems evident that the jacket will retain serviceable flexibility for many more years.

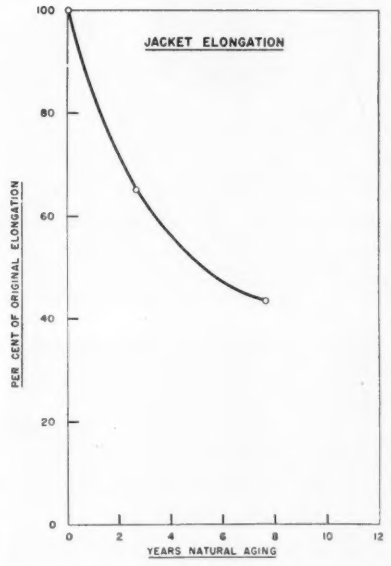


Fig. 3. * * * * * * * * * * *

Conclusion

Data have been presented on documented samples submitted to natural outdoor aging for periods of seven to nine years. This time exceeds the average service life of weatherproofed drop wire. These data demonstrate that neoprene jacketed drop wire remains serviceable after this aging and indicate that it will remain serviceable for a considerably longer time.

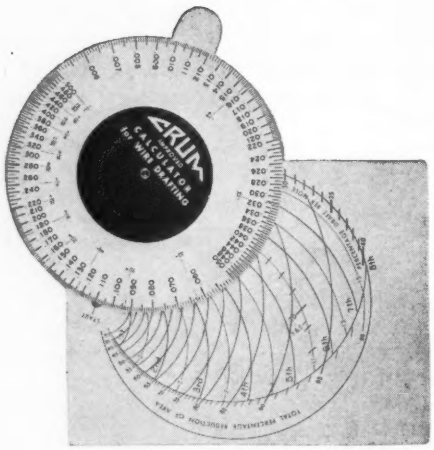
LITERATURE CITED

1. Bridgwater, E. R., Transactions of the American Institute of Chemical Engineers, 35, 435 (1939).
2. Youmans, E. D., Railway Signaling, April 1941.
3. Vacca, G. N., Errickson, R. H., and Lundberg, C. V., Industrial and Engineering Chemistry 43, 443 (1951).

THE NEW and IMPROVED . . .

CRUM CALCULATOR

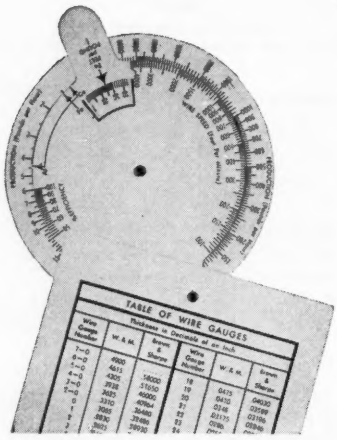
FOR WIRE DRAFTING



Front view of Crum Calculator.

THIS NEW DOUBLE-PURPOSE CALCULATOR WILL:

1. Provide quicker and more accurate information on die sizes and reduction areas;
2. Calculate wire production rates for various speeds and efficiencies.



Reverse view of Crum Calculator.

SOME OTHER FEATURES OF THE CALCULATOR

- Has new scale for more accurate determination of small percentages.
- Gives readings in B & S gauges.
- Intermediate lines provide reductions for 16 holes in one setting.
- New rectangular shaped back for better protection of calculator.
- More legible % draft-per-hole scale.
- Vinyl plastic construction, resistant to wear, warping, dirt, perspiration, wire drawing soaps—can be cleaned.
- Still fits your vest pocket.
- Handy tables of W & M and B & S gauges.
- Feet per pound calculating scale for steel, copper and aluminum wires.
- Durable, accurate, easy to use.

The improved Crum Calculator is worth its weight in gold in time saving —no laborious mathematical calculations necessary when you use it. Instruction sheet with examples accompany each Calculator. You should have one or more in your wire drawing department.

THE PRICE: $5.00 EACH

Send your orders to:

WIRE AND WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

(Exclusive distributors)

Successful Regional Meeting Held in California

West Coast Wire Men Gather in Los Angeles

Something new and different in the way of regional meetings was held in Los Angeles on June 11, 1954, in the West Coast Regional Meeting of **The Wire Association.**

★ ★ ★

There were a total of 185 paid registrations. 125 persons took the morning plant tour and 135, the afternoon trip. 175 attended the luncheon at **Colorado Fuel and Iron Company's** new warehouse and 190 were present for the dinner and evening session at the Statler Hotel.

★ ★ ★

Registration was held in the open air at the door of C. F. & I's

Earl R. Potter, Chairman Program Committee.

warehouse on Saybrook Avenue, where **B. J. Hill** and **C. W. Prasse** of the company were on hand to greet each visitor and extend an official welcome individually. Registration was in charge of the very efficient **Mrs. Dorothy Rome** of the **K. H. Davis Wire and Cable Company.** All badges had been made out in advance from reservation cards, so that there was no delay at the desk.

★ ★ ★

This year, instead of visits to wire mills, the Program Committee arranged for plant tours to two wire product fabricating concerns, the first one, following registration in the morning, being that of the new plant of the **National Screw and Manufacturing Company** on South Garfield Avenue, where bolts, screws and special fasteners for automotive, aircraft and various commercial applications, such as building, furniture and other hardware manufacture were observed.

★ ★ ★

Visitors saw some of the most modern high speed cold heading and threading equipment and a machine that slots the heads of ¼-20 screws at the rate of 450 a minute. They also saw a roll threader that can put threads on screws in sizes of #2 to #8 at the rate of 1000 a minute.

★ ★ ★

After completing the conducted tour, guests were free to visit any portion of the plant, satisfying their personal interests and having questions answered by machine operators.

★ ★ ★

H. R. McBurney, Vice President, and **Ed Jones,** Vice President in Charge of Manufacturing, were in charge of the visitors and were most hospitable hosts.

★ ★ ★

At noon the group returned to C. F. & I's warehouse, where **Harold Hansen,** District Sales Manager, served as host for a very excellent luncheon served through the courtesy of his company. Tables were given a gala appearance by really beautiful floral decorations contributed by **Earl R. Potter,** President of **Industrial Wire Products Corp.,** Los Angeles. At the close of the luncheon Mr. Hansen presented each guest with a cigarette lighter, the gift of the Colorado Fuel & Iron Corporation.

★ ★ ★

In the afternoon the gathering was driven to the Standard Steel Spring Division of the Rockwell Spring and Axle Company on East Slauson Avenue, one of the largest and most modern automotive spring plants in the country. They saw mass production at its best, with products moving through a series of automatic and highly efficient operations.

★ ★ ★

Tube forming was the first thing observed. Here .090 inch cold rolled strip is run through a Yoder tube mill and formed into 1.125

Richard E. Brown (left) presenting bronze plaque to H. R. Merriam (right).

inch diameter tubing continuously, to provide the structural elements for seat frames. Tubing is cut to length automatically and formed to specifications with Bliss presses. Retainers to hold the zig-zag spring ends to cross bars are added by a multi-head Federal welding machine.

★ ★ ★

Premier high carbon steel spring wire is fed through a Los Angeles zig-zag spring forming machine.

Length and size of the spreader loops are controlled by adjustments, which can also modify the number of links. Finished springs are then stress-relieved and tempered in a furnace, to prevent sagging and assure long life.

★ ★ ★

Assembly is done on a continuous conveyor belt, with all parts clipped manually or automatically pressed together as the seat travels down the conveyor. After assembly, the seats are placed on an overhead conveyor and transported to the paint department, where they are painted and dried in an oven. The magnitude of the operation may be judged by the size of the plant—190,000 square feet, all under one roof.

★ ★ ★

The plant is headed by **Harold Sloan,** General Manager. **Ed Wachter,** Purchasing Agent, served as host to the visitors, proving to be a truly capable and genial one.

★ ★ ★

The two plant tours proved to be worthwhile and informative and completely justified the collective opinion of the Committee that wire men would be interested in and would profit by seeing some of the operations of their customers.

★ ★ ★

On the completion of the second tour, around four o'clock, everyone was transported to the Statler Hotel, where additional persons, unable to be present for the daytime program, were registered for the evening events.

The Evening Program

In connection with and preceding the dinner, a pleasant interlude was offered members and guests in a cocktail party from 6 to 7 P.M., contributed by various West Coast concerns, the cost of which totalled about $600.00. These were **Bethlehem Pacific Coast Steel Corp., Columbia-Geneva Steel Corp., Planett Manufacturing Co., K. H. Davis Wire & Cable Corp., Industrial Wire Products Corp.** and **R. H. Miller Co.** After the close of the evening session, the cocktail party was resumed until 11:30 P.M.

★ ★ ★

At the dinner, **P. J. Siemonsma,** Assistant Treasurer of the **Planett Manufacturing Company,** Downey, California, served as toastmaster. He introduced **Ken Davis,** who after an address of welcome, asked **Earl C. Planett** to tell the gathering about **H. R. (Bob) Merriam.** His talk was witty and full of interesting anecdotes. Following this dinner a bronze engraved plaque was presented to Mr. Merriam of the Colorado Fuel and Iron Corporation to commemorate his completion of fifty years in the wire industry. The presentation of the plaque was made by **Major Richard E. Brown,** publisher of **Wire and Wire Products** and Executive Secretary of **The Wire Association,** representing the officers and Directors of the Association.

★ ★ ★

This presentation was followed by an address by **Dr. Lewis Perry,** Professor of Economics at **Pomona College,** Claremont, California, who most ably and interestingly discoursed on "The Impact of Changes in Defense Spending on Southern California Industries." His address was well received.

★ ★ ★

After this, **Jim Wilson,** Plant Manager of **Fanner Metal Products Company,** directed the drawing of door prizes that had been contributed by several companies, including **Industrial Wire Products Corp., Fanner Metal Products Co., Carboloy Department of General Electric Co.,** and **Industrial Compounds Co.**

★ ★ ★

The evening session concluded with a sound motion picture in color recently produced by the Colorado Fuel and Iron Corporation, under the direction of **Robert E. Olson,** of the company. It was entitled "Steel Party Line" and depicted the production of wire from mine to finished product—a fine picture and one of the best and most up-to-date on wire production that has been seen at an Association meeting.

(*Please turn to page* 914)

National Screw and Manufacturing Company

View of entire production area of plant, Towsend Woodscrew Threader Machines in foreground. * * * * * * * * * *

Header Dept. 28 Headors which can head screws and bolts ranging size from 1/16" to ½" diameter. * * * * * * * *

The Impact of Changes In Defense Spending On Southern California Industry

by Dr. Louis B. Perry
Associate Professor Economics
Pomona College
Claremont, California

This paper was delivered by Dr. Perry at the West Coast Regional Meeting of the Wire Association held at Statler Hotel, Los Angeles, on June 11, 1954.

Serious statements regarding business prospects often are mere wishful thinking. For example, in the spring of 1937 President Roosevelt, looking at only the more rosy figures of the recent past and failing to observe the inventory adjustment said, "We planned it that way." Almost immediately the economy went into a sharp recession! In the very early 1930's President Hoover repeatedly made the observation that "prosperity is just around the corner" but the business depression continued to pursue its course.

★ ★ ★

Such statements and their subsequent repudiation by events suggest the error that there is no factual basis for discussion of a business trend, particularly with respect to its defense expenditure aspects. To most people facts and figures are dull. A man does not have to be a statistician, however, to see reasons why there are maladjustments in the present economy that may need correction, with no small part of these problems having been the result of defense expenditures.

★ ★ ★

Let's examine some of the general facts pertaining to the health of the economies of the United States, the West and Southern California before looking at the significance of defense expenditures both regionally and locally.

★ ★ ★

For the United States as a whole the business decline has been flattening out. During the last few months little net slippage has occurred in employment. Department store sales have picked up. Industrial production has declined but seems to be stabilized. The index of the Federal Reserve Board, for example, remained at 123 in both March and April and rose to 125 in May. Further declines in industrial production may take place in the durable goods sector of the economy with the projected cutback in defense expenditures but these will not be surprises, if they occur at all. Steel mill operations have been relatively stable during the past two months (73% of capacity in May)—low, but steady. New steel mill orders being booked currently seem to show slight improvement and current opinion in this basic industry appears to indicate that operations will **at least** hold at current levels. The manufacture of agricultural implements has taken a turn for the better but auto inventories are still running high, thus presaging continued lower output in this industry as compared with 1953.

★ ★ ★

In the United States as a whole, the textile industry is still experiencing a depression; production in synthetic cloths, for example, has been cut sharply because of unprofitable prices. However, aggregate sales and orders of all manufacturers in various industries reporting to the Department of Commerce increased in April and inventories continued to decline after seasonal adjustment. The National Association of Purchasing Agents reported in May that only 33% of their member firms were still decreasing their inventories of purchased commodities. Another favorable element is the fact that aggregate consumption expenditures during the first quarter of this year exceeded production and were $2 billion ahead of 1953 at the same time—but the increase was in services, the consumption of durables actually declining 7% during this period.

★ ★ ★

All over the country the brightest spot in the business trend has been building construction which has hit new highs. The value of contract awards, for example, increased substantially in April, especially in housing with 109,000 starts. Figures available for May indicate these trends are continuing. A McGraw-Hill survey of larger business firms indicates a plan to spend as much for plant and equipment in 1954 as in 1953. The **Fortune** semi-annual survey of business expectations in 20 major cities shows that nearly half of the industrial leaders queried expect an upturn in sales in the last half of 1954. Fifteen of 40 leading business indicators analyzed by economists of the Standard Oil Company of New Jersey point definitely to a reversal in the current economic trend. The likeliest immediate prospect, however, is a prolonged "bottom" which could have political implications, of course, for the November elections.

★ ★ ★

Turning to the western region covered by the Twelfth Federal Reserve District (7 states—California, Oregon, Washington, Arizona, Nevada, Utah, Idaho) the picture of economic trends and prospects is quite similar to that of the United States as a whole. Nonagricultural employment seems to have stabilized after dropping each month since September, 1953. Manufacturing employment, after seasonal adjustment, appears to be still moving downward but only very slightly, a reflection principally of trends in metals and ma-

chinery. During the past year increases in the number of workers in the aircraft industry often offset declines in other fields but aircraft employment now seems to be quite steady at current levels. Unemployment in the 7 western states is at about 6% of the total civilian labor force, well below the peak of 11.6% in 1949.

★ ★ ★

Southern California (14 southernmost counties), particularly the Los Angeles Metropolitan Area (Los Angeles and Orange counties), tends to follow the nation in economic trends. Compared with a year ago, the general overall level of business activity is down over 4%. Indices that are up and strong include department store sales, building permits, new industrial plants and expansions (up 30% in April over the same month last year), and electric power. Indices that are down include total employment and total factory employment. The latter is off 3.2% from the peak of October, 1953, with total unemployment about 5.3% of the entire civilian labor force as against 9.6% in April, 1950. In the Los Angeles Metropolitan Area, the decline in factory employment has been smaller than in any other leading industrial center in the nation.

★ ★ ★

A key factor in the prosperity of Southern California as well as the Pacific Coast and the nation as a whole is defense expenditures. Nationally, defense output is still declining. The annual rate fell by $2½ billions the first quarter of 1954 and is now at a level of about $45 billions. The defense budget for fiscal 1955 provides for a dip of only about $1 billion a quarter but a large uncertainty, of course, is Indo-China. Part of the national war mobilization strategy has been to build an industrial base that will permit a World War III. Thus we should not be surprised if, on a national scale, some war-connected industries continue to operate at less than full capacity under present conditions for some time, yet, we hope and assume, above break-even points.

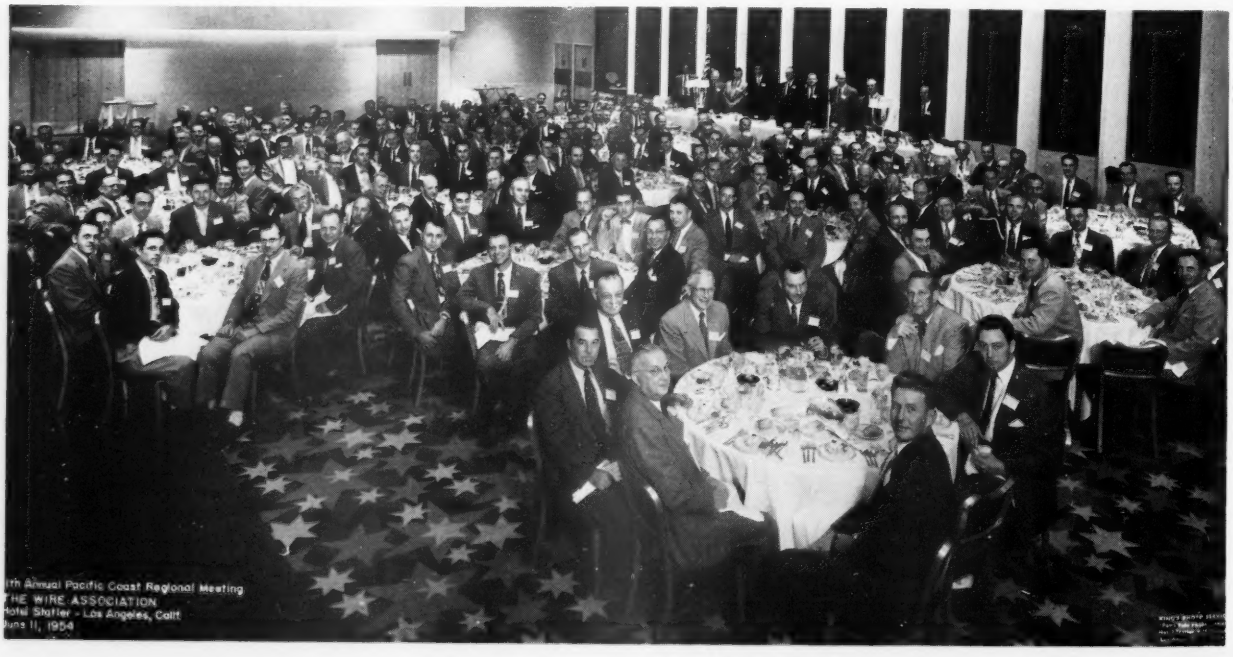
★ ★ ★

From 1940 to 1954, the 7 western states have had their own particular relationship to the nation with regard to defense spending and employment. On the average, our rate of unemployment has been above that of the nation during this period. One of the factors responsible for this situation has been the tremendous war-time growth of population which was subject to adjustment at the end of the war with the shut-down of defense industries. We have also had a high rate of immigration which tends to increase unemployment. As an area of rapid population growth and movement, therefore, the West has had difficulty in maintaining as high a ratio of employed to unemployed at the nation.

★ ★ ★

During World War II and Korea, however, our population tended to be more fully employed than that of the nation because of heavy defense output relative to other forms of manufacturing, especially in California. Until this past month, it has been the aircraft industry that has been a growing employment force in the West, offsetting declines elsewhere. Our expectation for 1954-55 is that the projected decline in defense spending will give the western states and Southern California a higher rate of unemployment than the nation as a whole. Areas where the aircraft industry is important, however, will probably experience a smaller decline due to the importance of the program and a fairly stable 2-year backlog of orders. Thus, the Los Angeles Metropolitan Area, with 28% of its manufacturing workers directly employed by the aircraft industry, may have a greater stability than the West in general (except for San Diego and Seattle where aircraft manufacturing also is important).

(*Please turn to page* 912)



THE NEW, REVISED EDITION

OF THE

WIRE & WIRE PRODUCTS

BUYERS' GUIDE

The 1954 edition was published in April and is available now.

It is completely revised, with many hundreds of changes in listings of rods, wire, wire products, electric wire and cable and machinery, equipment and supplies used by the wire industry. *It is the only directory covering the industry.*

This useful reference book will help you locate sources of supply for whatever you want—*when you need it.*

Members of The Wire Association receive copies without extra charge, as this service is included in their dues. Subscribers are entitled to a discount of 40 per cent.

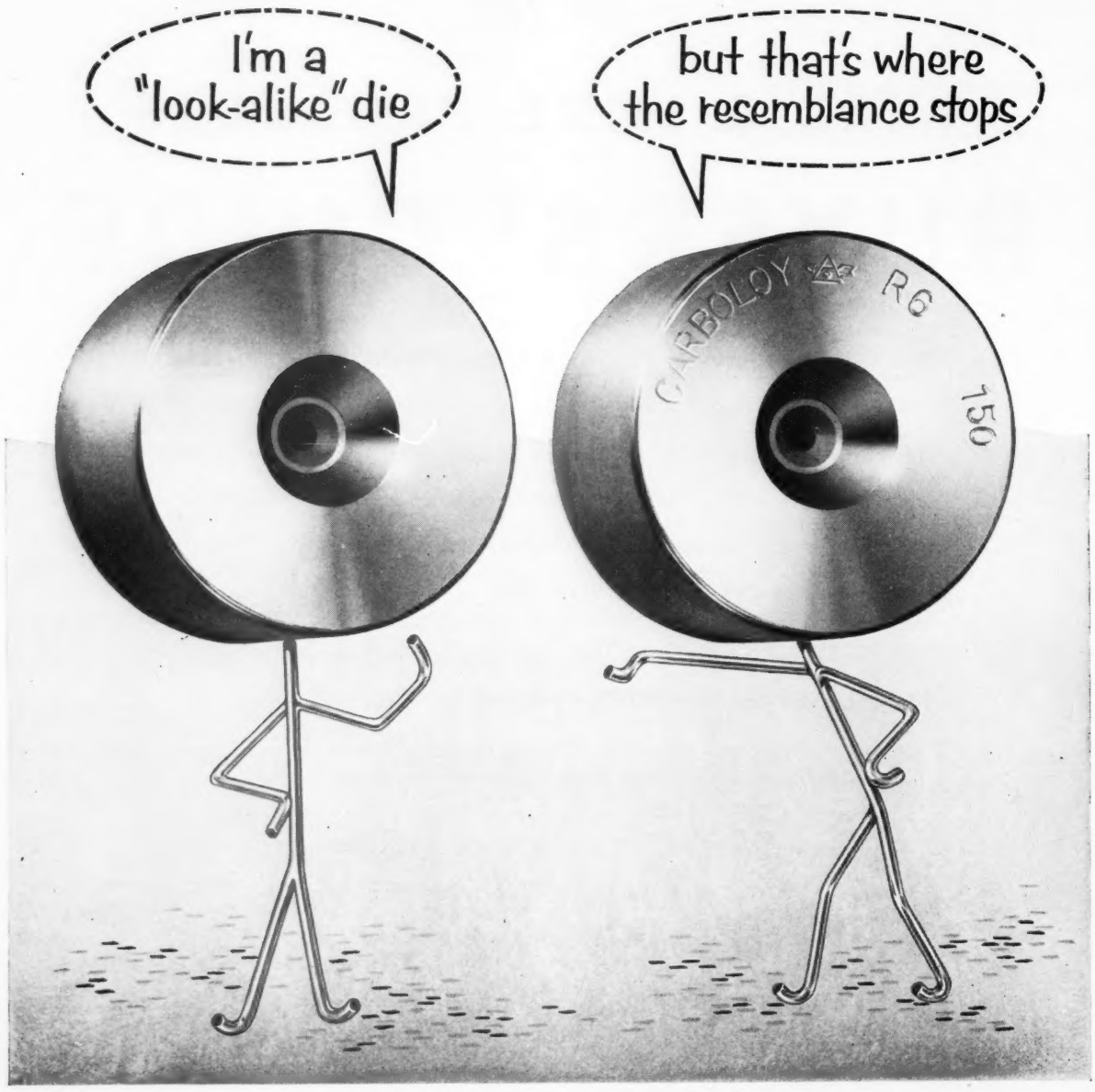
THE PRICE: $5.00

SEND ORDER TO

WIRE & WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

9 reasons why you



CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

should never say "die"— say..."Carboloy® wire dies"

CEMENTED CARBIDE

—because their 9 "unseen extras" help you increase production, lower costs.

These Carboloy "unseen extras" are:

1 Rigid Quality Controls
— Each Carboloy Wire Die must pass 29 rigid quality control tests.

2 Grades Continuously Improved
— You get the benefits without waiting for "new" grades.

3 Local Die Service Centers
— Expert die servicing and finishing facilities in Chicago, Detroit, Los Angeles and Pittsburgh.

4 Experienced Sales Engineers
— with special training, and years of wire-mill experience. They work with you — in your own mill.

5 Engineering Appraisal Service
— Trained engineers, backed by more than 25 years of carbide manufacturing experience, plus modern Carboloy engineering facilities, are at your service for special wire-die problems.

6 Large Local Stocks
— maintained in principal wire-drawing areas.

7 Free Training School
— Your die-room personnel will be instructed in the design, application and maintenance of carbide dies at the modern, completely equipped Carboloy Die Training School.

8 Free Technical Literature
— To help you order, use and service your carbide dies, a file of money-saving, timesaving information — the most complete in the industry — is available.

9 Manufacturing Know-How
— The Carboloy organization is continuously developing new techniques and methods. These are immediately reflected in lower prices to the customer.

Talk to a Carboloy Sales Engineer, today, and find out what these 9 factors mean to Carboloy Wire Die users, in their day-to-day operations. Send coupon or write.

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

Carboloy Department of General Electric Company
11171 E. 8 Mile Street, Detroit 32, Michigan

I would like the following free Carboloy services or literature:

☐ New Price List D-135
☐ Die Catalog D-130
☐ Complete information on Die Training School
☐ Call by a Carboloy Sales Engineer

Name_____ Position_____

Company_____

Address_____

City_____ Zone_____ State_____

THE ANNUAL CONVENTION OF THE WIRE ASSOCIATION

STATLER HOTEL, DETROIT, MICH., NOVEMBER 8-11, 1954

The Wire Association's Headquarters at The Statler Hotel
will be open from Monday, November 8th, every evening during the Convention.
Come and get acquainted.

THERE WILL BE A REGISTRATION FEE OF $11.00 FOR MEMBERS AND $13.00 FOR NON-MEMBERS, INCLUDING AN ANNUAL LUNCHEON TICKET, FOR ALL THOSE ATTENDING THE TECHNICAL SESSIONS AND MEETINGS.
PLEASE HAVE YOUR ASSOCIATION MEMBERSHIP CARD WITH YOU AND SHOW IT WHEN REGISTERING.

ADMISSION WILL BE BY BADGE ONLY—PLEASE WEAR IT.

THE WIRE ASSOCIATION PROGRAM COMMITTEE FOR THE 1954 CONVENTION

GENERAL CHAIRMAN
A. Earl Glen, Mgr., Die & Wear Part Sales
Carboloy Dept., General Electric Co.
Detroit, Michigan

GENERAL ACTIVITIES

EXECUTIVE SECRETARY
Richard E. Brown
The Wire Association
Stamford, Conn.

REGISTRATION
R. S. Spengel, Asst. Exec. Secy.
The Wire Association
Stamford, Conn.

ENTERTAINMENT
Eber J. Hubbard, President
Hubbard Spool Company
Garrett, Ind.

FERROUS DIVISION

CHAIRMAN
Raymond S. Worth, Mfg. Manager
Wire Mills Division
John A. Roebling's Sons Corp.
Roebling, N. J.

COMMITTEE MEMBERS
H. J. Godfrey
Chief Development Engineer
John A. Roebling's Sons Corp.
Trenton, N. J.

R. H. Hertzog
Metallurgical Engineer
John A. Roebling's Sons Corp.
Wire Mills Division
Roebling, N. J.

NON-FERROUS DIVISION

CHAIRMAN
James E. Flood, Chief Chemist
Plastic Wire & Cable Corporation
Jewett City, Conn.

COMMITTEE MEMBERS
Andrew Pudlak, Field Engineer
Copperweld Steel Corporation
Glassport, Penna.

Grayson B. Wood, Jr., Metallurgist
Scovill Manufacturing Company
Waterbury, Conn.

Glenn J. Moher, Manager of Methods
Wire and Cable Section
Canadian General Electric Co., Ltd.
Peterborough, Canada

All papers presented at the Convention by members of The Wire Association are eligible for consideration for the Annual Medal Award, and will be voted upon by the Board of Directors at the next Spring meeting of that body.

Technical papers are preprinted in the October issue of Wire and Wire Products insofar as possible. Titles to papers accepted will be given to The Wire Association and duly copyrighted at the time of publication.

All wire mill men and wire mill suppliers are invited to attend this convention, see how the Association functions and participate in the activities.

Hotel reservations should be made by members of the Wire Association direct to the Secretary.
MAKE YOUR PLANS NOW TO ATTEND AND SEND YOUR RESERVATION PROMPTLY

MONDAY, NOVEMBER 8th

9:00 A.M.
REGISTRATION

10:00 A.M.
DIRECTORS' MEETING

12:30 P.M.
PROGRAM COMMITTEE LUNCHEON

THE CONVENTION PROGRAM

STATLER HOTEL, DETROIT, MICH., NOVEMBER 8-11, 1954

MONDAY, NOVEMBER 8th

9:00 A.M. Registration Desk opens on the mezzanine floor.

10:00 A.M. Annual Meeting of the Board of Directors of the Wire Association.

12:30 P.M. Directors' Luncheon for Program Participants.

AFTERNOON SESSION—2:00 P.M.

Joint Technical Meeting for Both Ferrous and Non-Ferrous Groups.

CHAIRMAN OF MEETING

John H. Richards, Jr., Chem. Eng., Apex Alkali Products Co., Philadelphia, Pa.

Address of Welcome by Leonard C. Crewe, Jr., Pres., Maryland Fine & Specialty Wire Co., Cockeysville, Md., President of The Wire Association.

SYMPOSIUM ON WIRE DRAWING LUBRICANTS

PANEL MEMBERS

Dr. Gray Verner, Technical Director Standard Industrial Compounds Co. Chicago, Ill.	Leon Salz, Mgr. Lubricants Div. Magnus Chemical Co. Garwood, N. J.	A Member from Apex Alkali Products Co. Philadelphia, Penna.

Panel members will discuss wet and dry drawing lubricants for ferrous and non-ferrous wires and will welcome questions and comments from the floor following their presentations.

PAPER: "Quality Control in the Wire Industry."	Control limit calculations and modified method compared with new method found successful in job-shop quality control installations.	by Axel U. Sternlof, Div. Product Eng., Electrical Cable Works American Steel & Wire Div. U. S. Steel Corp. Worcester, Mass.

TUESDAY, NOVEMBER 9th

FERROUS SECTION

MORNING SESSIONS—9:30 A.M.

CHAIRMAN OF MEETING

H. Clark Smith, Jr., Supt., Heavy Wire Div., Wilbur B. Driver Co., Newark, N. J.

PAPER: "Effect of Coiling Temperatures of Hot Rolled Rods on Scale Formation and Rod Surface."	Temperature of rods at finishing has direct bearing on scale and the problem of removing it.	by Robert A. Stebbins, Asst. Supt. Rod and Wire Div. Bethlehem Steel Co. Johnstown, Pa.
PAPER: "Application of Salt Baths in Processing of Wire."	Growth of use of salt baths in the wire industry makes this discussion of applications timely.	by Leon B. Rosseau, Vice Pres. Ajax Electric Company Philadelphia, Pa.
PAPER: "Continuous Patenting, Cleaning and Coating of Steel Wire."	A rope manufacturer's point of view on the processing of wire to achieve uniform quality.	by Donald K. White, Foreman #2 Wire Mill John A. Roebling's Sons Corp. Trenton, N. J.

NON-FERROUS SECTION

CHAIRMAN OF MEETING

Glenn J. Moher, Mgr. of Methods, Wire & Cable Section, Canadian General Electric Co., Peterborough, Can.

PAPER: "Rigid and Semi-Rigid PVC Insulations."	Properties of these materials and their applications to electric conductors, based on recent laboratory developments.	by J. L. Foster, Product Engineer Plastic Materials B. F. Goodrich Chemical Co. Cleveland, O.
PAPER: "Dry Blending"	Recent developments in dry blending and effects on wire coating properties.	by Milton S. Greenhalgh Construction Materials Division General Electric Company Bridgeport, Conn.
PAPER: "Automotive Wiring for New 12 Volt Systems."	Changes in the voltage of batteries require new types of wires-described in this paper.	by H. R. Hartzell, Asst. Chief Engineer Delco-Remy Div., General Motors Corp. Anderson, Ind.

TUESDAY, NOVEMBER 9th (cont'd)

AFTERNOON SESSION—2:00 P.M.

FERROUS SECTION

CHAIRMAN OF MEETING

Frederick W. Leslie, Supt., G. F. Wright Steel & Wire Co., Worcester, Mass.

PAPER: "Prestressing Wires-Stress-Relaxation and Stress-Corrosion Up to Date."	Latest information and Importance of protection against corrosion accented.	by Gordon T. Spare, Research Project Engineer American Steel & Wire Div. United States Steel Corp. Cleveland, Ohio
PAPER: "Phosphate Coating of Steel Wire."	How phosphate coatings function and their advantages are covered in this paper.	by James S. Leland, Engineer Parker Rust Proof Company Detroit, Mich.
PAPER: "Acid Cleaning of Stainless Steel."	Stainless steel is not an easy-to-handle metal and this paper adds to the understanding of its proper cleaning.	by John H. Corson, Director of the Laboratory Carpenter Steel Co. Reading, Pa.

NON-FERROUS SECTION

CHAIRMAN OF MEETING

Andrew Pudlak, Field Eng., Copperweld Steel Co., Glassport, Pa.

PAPER: "Magnet Wire Coatings."	Announcement and description of a new coating material recently developed.	by Dr. J. A. Loritsch, Mgr. Alkyd Products Eng. Chemical Materials Div. General Electric Co. Schenectady, N. Y.
PAPER: "Processing of Titanium Wire." (tentative)	Increased production and uses of this metal have broadened the number of uses and interest in this wire.	by A Member from Rem-Cru Titanium Corp. Midland, Pa.
PAPER: "Composite Wires by Electroplating."	A discussion of composite metals and the manufacture of composite wires.	by Edward G. Slick, Supervising Engineer Sylvania Electric Products Warren, Pa.

WEDNESDAY, NOVEMBER 10th

MORNING SESSIONS—9:30 A.M.

FERROUS SECTION

CHAIRMAN OF MEETING

Glenn R. Lee, Wire Mill Supt., Continental Steel Corp., Kokomo, Ind.

PAPER: "Cooling of Steel Wire in Drawing."	Report on investigation of effect of air volume and finishing speed on wire temperature rise and physical property.	by Norman A. Wilson, Asst. Director of Research Morgan Construction Company Worcester, Mass.
PAPER: "Continuous Wire Drawing and Packaging."	This new process has expanded beyond original concepts. Principles explained and new fields of application outlined.	by Wm. H. Richardson, Vice Pres. The Driscoll Wire Co. Shelton, Conn.
PAPER: To be announced.		by H. V. Harding, Tech. Asst. to Pres. Elox Corp. Detroit, Mich.

NON-FERROUS SECTION

CHAIRMAN OF MEETING

Grayson B. Wood, Jr., Met., Scovill Manufacturing Co., Waterbury, Conn.

PAPER: "The Application of Wire and Cable to Wire and Cable Mills."	Deals with the peculiarities of wire and cable power loads, drives, etc., as they affect the choice of wire and cable feeding the various types of mill machinery.	by Phillip J. Croft, Chief Engineer Canada Wire and Cable Co. Ltd. Toronto, Can.
MOTION PICTURE	A sound-color picture depicting: "Copper, Mined to Finished Products."	Shown through the courtesy of the Canada Wire and Cable Co., Toronto, Can.

WEDNESDAY, NOVEMBER 10th (cont'd)

AT 1:00 P.M. — THE ANNUAL WIRE ASSOCIATION LUNCHEON

LADIES WELCOME

The Mordica Memorial Lecture
by Carl E. Johnson, Supt., Rod & Wire Mills, Bethlehem Steel Co., Sparrows Point, Md.

LADIES WELCOME

THE PRESENTATION OF AWARDS FOR 1953

MEDAL AWARD: To Vito J. Vitelli, Process Engineer, Metallurgical Engineering Dept., Steel Wire Mills Div., John A. Roebling's Sons Corp., Trenton, N. J., for the most meritorious paper—"The Drawing of Shaped Steel Wire."

CERTIFICATE OF HONORABLE MENTION: To Dr. F. R. Morral, Head, X-Ray Dept., Div. of Metallurgical Research, Kaiser Aluminum and Chemical Corp., Spokane, Wash., and Dr. F. A. Schaufelberger, Chemical Construction Corp., New York, N. Y., for the best ferrous paper—"Molten Salts for The Wire Industry."

CERTIFICATE OF HONORABLE MENTION: To F. W. Wurtzell, W. J. Canavan and B. H. Maddock, Development Engineers, Bakelite Company, New York, N. Y., for the best non-ferrous paper—"A Review of Fluorothene in the Wire and Cable Industry."

AT 4:00 P.M.—THE ANNUAL MEETING OF THE WIRE ASSOCIATION
This is the annual business meeting of members of the Association. Your personal attendance is needed and urged.

Chairman of Meeting
Leonard C. Crewe, Jr., President,
The Wire Association

IN THE EVENING

THE ANNUAL STAG SMOKER—DINNER

6:30 P.M.—Cocktail Bar Opens

7:30 P.M.—Dinner and Show

CHAIRMAN, ENTERTAINMENT COMMITTEE: Eber J. Hubbard, Jr.

COME ONE, COME ALL—AND HAVE A GOOD TIME!

THURSDAY, NOVEMBER 11th

The day is devoted entirely to plant inspection tours, of which there are two, as follows:

THESE TOURS WILL BE TAKEN JOINTLY BY BOTH THE FERROUS AND NON-FERROUS GROUPS.

In the morning busses will leave the Hotel at 9:00 A.M. for a tour of the plant of the Carboloy Dept., General Electric Company, Detroit.

At noontime, luncheon will be served with the compliments and through the courtesy of the Carboloy Department.

In the afternoon, busses will leave the Carboloy plant for a tour of the plant of the Ford Motor Company in Dearborn, Michigan.

FOR THESE TOURS, ALL PERSONS MUST GO BY BUS. NO PRIVATE CARS MAY BE USED. TO BE ADMITTED, ALL VISITORS MUST WEAR THEIR BADGES; NO EXCEPTIONS, PLEASE: THESE MEASURES ARE FOR SECURITY AND SAFETY.

These plant inspection trips conclude the 1954 Convention.

RESEARCH PAPERS ARE PREPRINTED IN THE OCTOBER ISSUE OF WIRE AND WIRE PRODUCTS.

The Discussions and the Mordica Memorial Lecture will be printed in the January issue of Wire and Wire Products.

Papers not received in time for preprinting will be published in the November and December issues of Wire and Wire Products.

Automatic Travel and Discharge Bucket

A traveling bucket for handling dry granulated or lump materials and moist mixtures, has been developed by the **Cleveland Tramrail Division** of **The Cleveland Crane & Engineering Co.**, Wickliffe, Ohio.

★ ★ ★

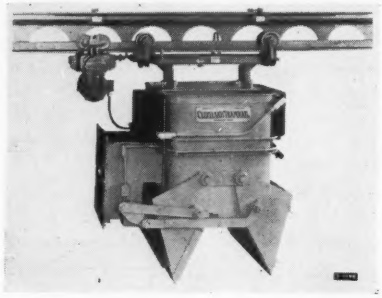
Designed for use on Cleveland Tramrail overhead track and crane systems, the bucket carrier is powered by a tractor drive. The unit illustrated is one of several engineered for the automatic dispatching of loads of damp clay batch from a mixer to two presses. The travel route includes a lift of 25 feet.

★ ★ ★

The bucket has a capacity of 22.5 cu. ft. and is rated at 2,000 lbs. It has a split-hinged gate that is operated by a motor which is protected by a box enclosure. The unusually wide opening of the gate facilitates discharge of slow moving, tacky materials.

★ ★ ★

Different size traveling buckets of many types have been developed by Cleveland Tramrail for various materials. The track systems on which they operate have been provided with a wide variety of control methods enabling nearly every conceivable kind of operation from hand-propelled to semi-automatic and completely automatic.



Automatic Travel and Discharge Bucket.

Data Gathering Improved by New Chart Paper and Ink

A new line of chart paper and recording inks designed to meet increased demands from an automation-minded industry for greater accuracy, faster recording speeds and broader applications of recording has been announced by **Minneapolis-Honeywell Regulator Company's** Industrial Division.

★ ★ ★

The new developments grew out of a research program believed to be the first full-scale one ever undertaken in the 100-year history of the instrument industry. The program involved the utilization of modern inspection and quality control procedures through all phases of production—from selection of the grades of pulp through processing, printing and packaging.

★ ★ ★

The chart paper, evolved in the research program, is claimed to provide up to 100 per cent greater accuracy in recording data. Primarily this is accomplished by controlling the "dimensional stability" (expansion and contraction changes affected by humidity variations) of the paper.

★ ★ ★

MICROMETER PRECISION — MICRO-WELD — TRADE MARK REGISTERED

MODEL M-T, FOR BENCH MOUNTING

This welder was designed and developed expressly for welding all types of fine wire: Aluminum, Copper, Brass, Bronze, Steel and Steel Alloys, ranging in size from .005" to .020" diameter.

Unit design of frame, transformer and power sub-assemblies permit other range of sizes to suit requirements.

Equipped with a temperature indicating annealing and tempering device, voltage regulator and meter to compensate for voltage fluctuation, wire cutters, extra large 5" diameter magnifying glass, fluorescent light and extension cord. Welder can be supplied for bench mounting, or mounted on 4-wheel truck.

The adaptability of this unit for welding all types of wire, either ferrous or non-ferrous, in sizes from .005" to .020" diameter, makes it ideal for the fine wire manufacturer.

MICRO PRODUCTS CO.,

20 NO. WACKER DR., CHICAGO 6, ILL.
Telephone: STATE 2-7468

The new chart paper and ink, which are used on the firm's strip and circular chart recording instruments, are now in production and will be offered at no increase in cost.

Australians Hold Wire-Symposium

The Australian Institute of Metals recently held a symposium on "The Theory and Practice of Wire Drawing" under the auspices of the Physical Metallurgy Division of the Melbourne Branch.

★ ★ ★

Seven papers were delivered covering such subjects as non-ferrous metal and alloy wire drawing, wire drawing dies, ferrous and non-ferrous wire rod sizes, drawn galvanized rope wire, arc welding electrodes, the relation of surface temperature to tensile strength in drawing copper wire and drawing temperature-lubrication relations during copper wire drawing.

★ ★ ★

The symposium was held in the auditorium of the Engineering School of the University of Melbourne and represented a tremendous amount of research to provide the material for the excellent papers presented.

Announcement of New Grinding Machine

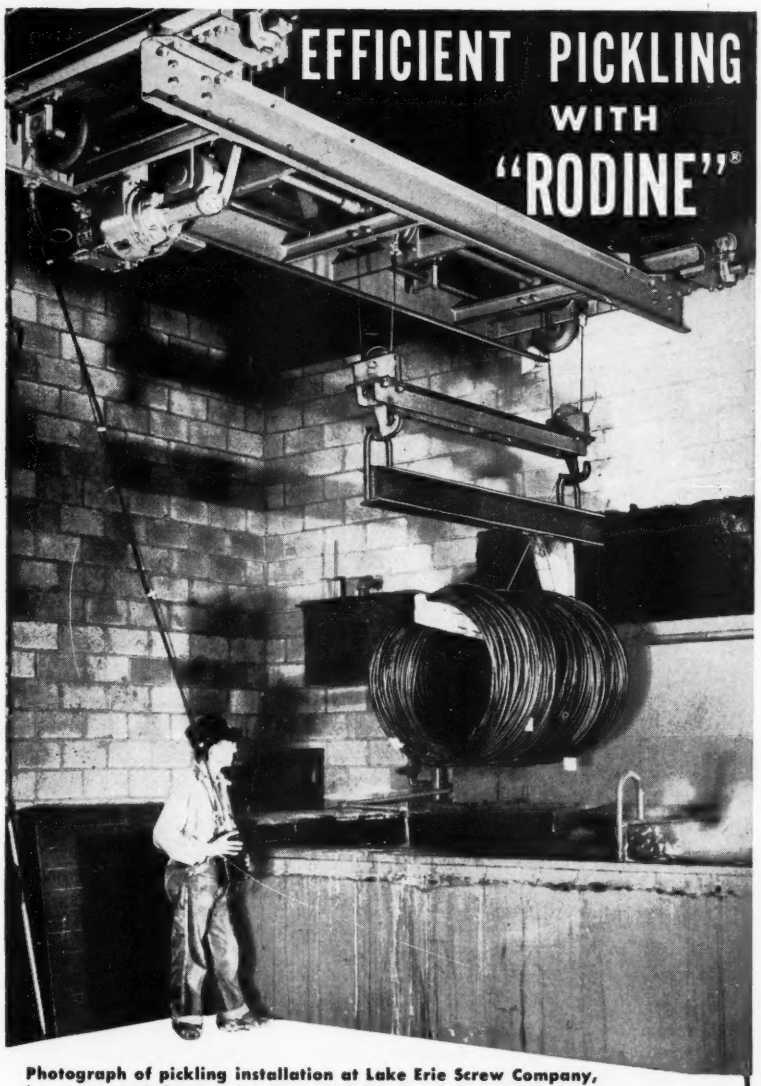
Norton Company, Worcester, Mass., announces its new Type CV-4 Semiautomatic Angular Wheel Slide Grinding Machine. The new machine replaces the widely used Type C Angular Machine.

★ ★ ★

The CV-4 Angular Machine rapidly grinds thrust surfaces and adjacent diameters simultaneously in a single, automatically controlled plunge grind. It cuts grinding costs by eliminating the separate operation normally necessary when similar jobs are done in conventional cylindrical grinders. The machine produces a concentric grain pattern in the finish of the shoulder or thrust surface ground.

★ ★ ★

Faster sizing qualities and sim-



Photograph of pickling installation at Lake Erie Screw Company, by courtesy of The American Monorail Company, Cleveland, Ohio.

Rod and wire are pickled clean in "Rodine"-inhibited acid without waste of either acid or metal. Breakage in drawing, from acid brittleness, is minimized.

Wire and rod, pickled with "Rodine", as compared with less effective inhibition, are larger in diameter, and when drawn to the finished gauge the coils are longer and correspondingly heavier.

"Rodine" more than pays for itself in savings of acid and metal.

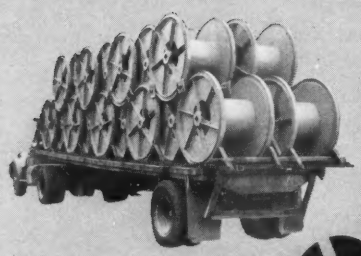
AMERICAN CHEMICAL PAINT COMPANY

CHEMICALS ACP PROCESSES

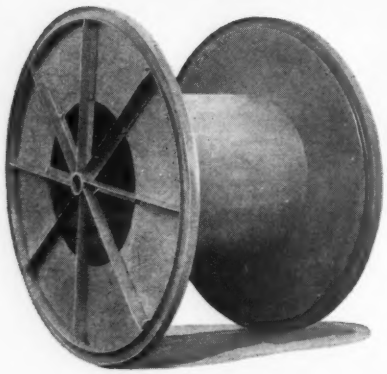
General Offices:
AMBLER, PENNSYLVANIA
Detroit, Mich. *Niles, Calif.* *Windsor, Ont.*

There's no premium on INGENUITY at NYECO

Here are 32 Steel Shipping Reels being delivered on 1 especially rigged truck. One more example of the versatility and flexibility that go into every NYECO job . . . that make for happy customer relationships.



NYECO Steel Shipping Reels



YOUR BEST BUY!

because they cost so little more, last *12 times* longer than wooden reels, require minimum maintenance. Rugged weatherproof, splinter-proof, warp-proof construction protects costly cable against damage due to dropping, bouncing, rough handling. It doesn't pay to risk an investment of thousands on inferior reels.

ANY QUANTITY | ANY SIZE | ANY LOAD | FLANGE DIAMETER FROM 36" UP

SERVICE IS OUR BUSINESS: Qualified engineering staff will translate your problems into practical designs, from idea to finished product—or we'll work from your blueprints. 2 large modern plants with every automatic production facility, 100 in skilled personnel. Fast deliveries—motor, rail, water shipping at the premises.

For prompt, reliable, down-to-earth data and quotations

WRITE, PHONE, WIRE

NYECO

Specialists to the Wire Industries for Over 45 Years

NEW YORK ENGINEERING COMPANY

75 West Street, New York 6, N. Y.

TELEPHONE: WHitehall 4-5380 **CABLE:** NYECO, N. Y. **PLANTS:** YONKERS, N. Y.

These leading mills prefer NYECO Steel Reels: OKONITE, ROEBLING, WESTERN ELECTRIC, GENERAL CABLE, ANACONDA, PHELPS DODGE

plified operation are built into the CV-4 Angular machine. Fast, accurate sizing comes from the feeding efficiency of the wheel feed mechanism with its hydraulically rotated, micrometer-screw feed. This mechanism also includes a "click-count" index with which settings for work diameter reduction in increments as fine as .0001" are made instantly and without visual attention.

★ ★ ★

Operation is further simplified in that both the length and rate of automatic feed are quickly set from the normal operating position. In addition, the hand wheel that adjusts the grinding wheel feed has been located on the machine base at the operator's right hand instead of on the movable wheel slide as on the earlier machine. This graduated wheel continually indicates the amount of feed as it rotates past a fixed pointer in both manual and automatic feed.

Top National Safety Council Award to Firth Sterling

The Award of Honor, highest safety award of the National Safety Council, has been conferred upon **Firth Sterling Inc.** for the year 1953. **H. H. Brainerd,** Executive Manager of the Western Penna. Safety Council, local chapter of the National Safety Council, presented the plaque to **K. D. Mann,** President of Firth Sterling. Also at the presentation were **J. T. O'Brien,** Vice President-Operations, and **F. J. McKay,** Director of Industrial Relations.

★ ★ ★

Outstanding in the Firth Sterling 1953 safety record was the occurence of only 10 loss-time accidents which were of minor nature with loss time negligible. During a period of nine months the company completed 1,778,915 man hours with no loss-time accidents. Firth Sterling maintained a par rate for frequency of 3.0 compared with the industrial standard of 9.7, while the par rate for severity dropped to .05 compared to the industrial average of 1.20.

New Method of Skyscraper Construction Uses Bolts, Nuts and Washers

The "high strength bolt" method of erecting structural steel framework, represents one of the newer developments in skyscraper construction which may replace rivet or welded construction.

★ ★ ★

Design and construction engineers report that bolted joints are stronger. Powerful clamping force which produces extreme friction accounts for the extra strength. Engineers of United States Steel Supply division of **United States Steel Corporation** and **Lindberg Steel Treating Company** co-operated in developing successful heat treating methods for the washers which enable them to transmit the clamping force without gouging or scoring. In addition to higher surface abrasion resistance, heat treating provides greater ductility, permitting the washers to conform to the fastened structural steel members.

★ ★ ★

Results to date show that bolts, nuts and washers are easier and safer to install. Less labor and installation equipment is required. Other advantages claimed are the elimination of the noise of riveting and maintenance costs.

Continuous Rod Mill to be Installed by Bethlehem Steel

A contract for a continuous, three-strand wire rod mill has been received by **Morgan Construction Company** from Bethlehem Steel Company. It will replace a two-strand mill erected by Morgan in 1909 at Johnstown, Pa.

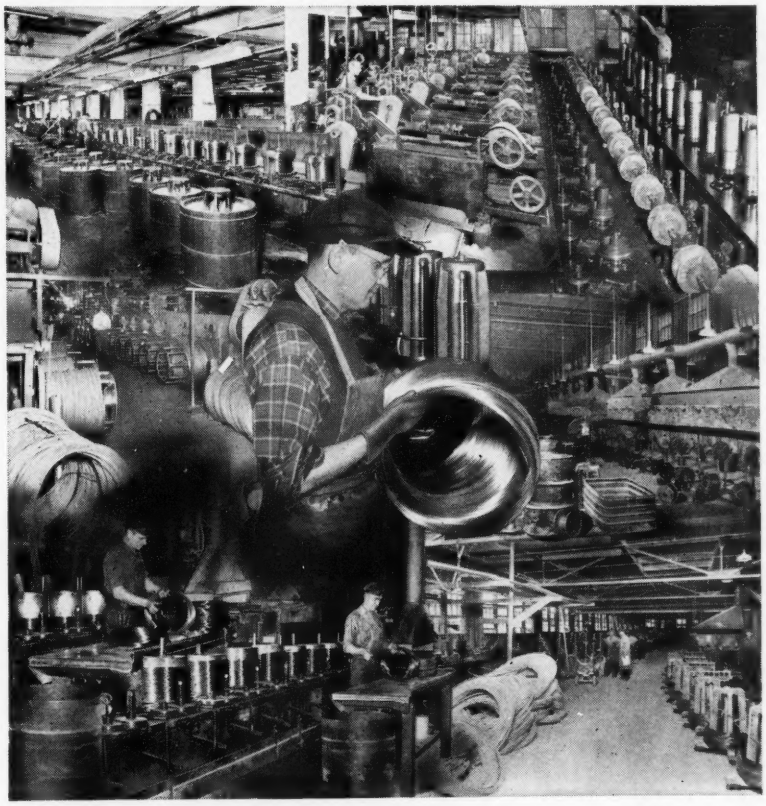
★ ★ ★

President Philip M. Morgan, in announcing receipt of the contract, said delivery would start in July, 1955 with operations of the mill slated for late Fall of 1955.

★ ★ ★

The new mill will produce rods at rate of 170 miles an hour. The old two-strand mill produced same size at 64 miles an hour.

★ ★ ★



Just think how lucky we are that we don't have to pay taxes on how much we think we are worth.

Modesty, we admit, is not one of the major sins among us here at Johnson. We cannot say that we lack confidence in ourselves, and that is one of the reasons why our people have achieved some things considered impossible in the wire industry. This has led to the building of equipment designed and built by JOHNSON engineers, equipment that, we claim, unhesitatingly if not modestly, is the best in the wire drawing world.

JOHNSON STEEL AND WIRE COMPANY, INC.

WORCESTER 1, MASS.

New York Philadelphia Pittsburgh Cleveland Detroit Akron
Dayton Chicago Atlanta Houston Tulsa Los Angeles

A SUBSIDIARY OF PITTSBURGH STEEL COMPANY

More efficient two-blow cold heading of the above Leveling Screw was achieved when the manufacturer switched to Keystone "Special Processed" Wire.

The excellent flow properties of this superior cold heading wire provided the desired upsetting and die forming qualities necessary to withstand the severe displacement of metal during the two blow operation. Longer die life, increased production, lower per-unit cost and a higher quality finished product were the end results.

Keystone is doubling its production capacity on "Special Processed" wire to meet the ever increasing demand of new customers while continuing to serve its present customers. Keystone is prepared to help solve any of your industrial wire problems. Your inquiry is welcomed.

Keystone Steel & Wire Company
Peoria 7, Illinois
Industrial Wire Specialists

The new mill will have 23 stands and be fed from the same Morgan furnace erected in 1909, with the billets 30 feet long and two and a half or three and three-quarter inches on each side. The old mill uses 30-foot billets, but only one and three-quarter inches on each side.

★ ★ ★

The coils of steel rod produced by the mill are the "raw material" used in manufacturing of nails, barbed wire and other wire products.

Rust Prevention Made Easy With New Dispenser

A new, time-saving method of rust prevention, utilizing 12-ounce pressurized, push-button cans, has been announced by **E. F. Houghton & Co.,** manufacturers of rust preventives.

★ ★ ★

Containing "Rust Veto Spray," these dispensers provide a quick, clean, and effective way to apply an even, transparent protective film to metal parts. It is especially good for protecting small items such as tools, dies, gauges, precision parts, hardware and other items being stored.

★ ★ ★

The thin, transparent film protects metal parts for long periods and need not be removed when the item is ready for use. For further information, write E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Bearing Bronze for Maintenance, Repair, and Production Described in Bulletin

How Asarcon 773 Continuous-Cast bearing bronze (SAE 660) saves money in factory maintenance and production by virtue of the unique advantages the product offers in length, size, machining time, metallurgical characteristics, and physical properties is explained in a new 6-page bulletin just published by the Continuous-Cast Products Department of **American Smelting and Refining Company.**

★ ★ ★

The bulletin also describes in detail the patented Asarco Continuous-Cast process by which a variety of bronze alloys is cast into rods, tubes, and shapes of many different diameters and profiles. This process exclusively produces as mill products a large group of copper-base alloys which were formerly available as foundry castings only. The mill products are long, straight, uniform, sound and with closely held dimensions. Where quantity production is involved, they are perfectly adaptable to fabrication on automatic screw machines.

★ ★ ★

For free copy write Continuous-Cast Products Department, American Smelting and Refining Company, Barber Station, Perth Amboy, N. J.

Kiln Type Ovens for Baking, Heating, Drying and Curing

Michigan Oven Company, 415 Brainard, Detroit, announces the introduction of a complete new line of standard Kiln Type Ovens for baking, heating, drying and curing.

★ ★ ★

These ovens, which are competitively priced, are designed to include several of the custom-built features not ordinarily found in standard ovens. These construction features make it possible for the MOCO Standard Oven to maintain a high degree of heat uniformity while substantially cutting fuel consumption.

★ ★ ★

The oven is available in six sizes, with work space ranging from 4-ft. wide by 4-ft. deep by 6-ft. high to 6-ft. wide by 7-ft. deep by 6-ft. high. It operates on either gas fuel or electricity

★ ★ ★

This product is available for prompt delivery. Further information may be obtained through manufacturers' agents in all principal cities.

★ ★ ★

Michael J. Curry has been appointed to head the laboratory in place of Mr. Hecht.

WIRE BARGAINS

From Our Warehouse Stock — All Materials Subject to Prior Sale

1,000 lbs.	.032" Dia. x Coils	70-30 Brass, H.H.	@ $.42	lb.
3,200 lbs.	.032" Dia. x Coils	70-30 Brass, S. Ann.	@ $.42	lb.
1,500 lbs.	.036" Dia. x Coils	70-30 Brass, H.H.	@ $.42	lb.
400 lbs.	.040" Dia. x Coils	Gr. "A" Phos. Br., H.	@ $.62	lb.
650 lbs.	.015" Dia. x Spools	18% Ni. Si. S. Ann.	@ $.69	lb.
950 lbs.	.018" Dia. x Spools	10% Ni. Si. S. Ann.	@ $.63	lb.
2,200 lbs.	.040" Dia. x Spools	D.H. "Nichrome," Br. Ann.		
72 lbs.	.020" Dia. x Coils	Type 316 St. St., Ann.	@ $.99	lb.
180 lbs.	.025" Dia. x Coils	Type 316 St. St., Ann.	@ $.99	lb.
400 lbs.	.028" Dia. x Coils	Type 316 St. St., Ann.	@ $.99	lb.
600 lbs.	.033" Dia. x Coils	Type 316 St. St., Ann.	@ $.94	lb.
300 lbs.	.045" Dia. x Coils	Type 316 St. St., Ann.	@ $.81	lb.
900 lbs.	.045" Dia. x Spool	Type 316 St. St., Ann.	@ $.81	lb.
400 lbs.	.055" Dia. x Coils	Type 316 St. St., Ann.	@ $.79	lb.
155 lbs.	.063" Dia. x Coils	Type 316 St. St., Ann.	@ $.79	lb.
1,300 lbs.	.060" Dia. x Coils	Type 310 St. St., Cu. Flash	@ $.85	lb.
1,500 lbs.	.1035" Dia. x Coils	Type 430 St. St., Cu. Flash	@ $.34	lb.
2,500 lbs.	.128" Dia. x Coils	Type 430 St. St., Cu. Flash	@ $.34	lb.
500 lbs.	.187" Dia. x Coils	Type 430 St. St., C.D. Ann.	@ $.28	lb.
4,500 lbs.	.207" Dia. x Coils	Type 310 St. St., C.D. Ann.	@ $.60	lb.
8,000 lbs.	.221" Dia. x Coils	Type 302 St. St., CuFl. C.D.A.	@ $.34	lb.
300 lbs.	.250" Dia. x Coils	Type 430 St. St., C.D. Ann.	@ $.28	lb.
4,000 lbs.	.269" Dia. x Coils	Type 430 St. St., Cu. Flash	@ $.24	lb.
800 lbs.	.341" Dia. x Coils	Type 430 St. St., Cu. Flash	@ $.22	lb.
24,000 lbs.	.0195" Dia.	Comm. Soft		

We carry a full line of stainless steel rod and bar and tubing.
We carry Saran pipe and tubing for your plating jobs.

Our inventories change daily. If the wire you need is not listed consult us anyway.

ACADEMY METAL PRODUCTS CO., Inc.

611 Jefferson Street, Hoboken, N. J.

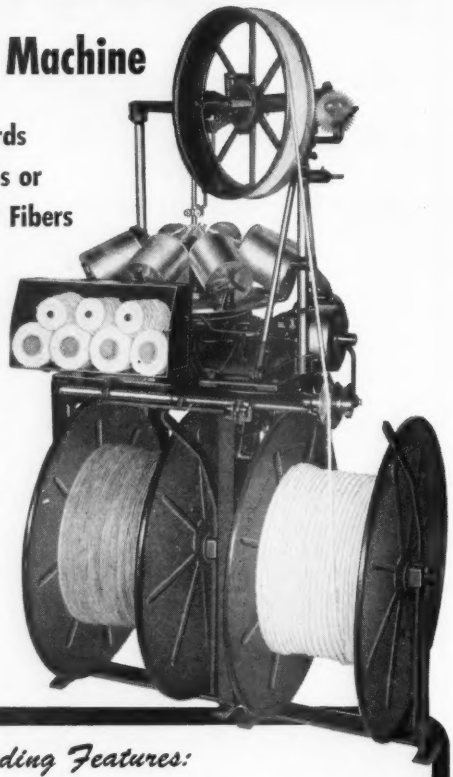
TELEPHONES:

HOboken 2-8633, 8634 — **New York City WOrth 4-0068**

WARDWELLIAN®

Type D Serving Machine

For Insulating Electrical Cords and Conductors with Asbestos or Cotton Roving, Glass and other Fibers



Plain or thread-reinforced asbestos roving, cotton roving, glass and other fibers may be employed as a covering medium.

The machine stops automatically upon exhaustion or breakage of the serving material. Direction of rotation of the supplies may be changed to serve with either a right- or left-hand wrap.

Equipped with adjustable traverse, supply and windup stands and windup driving mechanism.

Outstanding Features:

- Capacity one to eight supply packages.
- Production dependent upon construction of product.
- Machine equipped with electric stop-motion.
- Standard set of seven change-gears furnished with each machine.
- Serving head speed 300 R.P.M.
- Driving pulley 7″ diameter, 1¾″ belt. Speed 690 R.P.M.
- Ratio pulley speed to serving head speed 2.3 to 1.
- Capstan 18″ diameter, 3″ face.
- Opening through serving head ⅝″ diameter.
- Maximum diameter of conductor covered, No. 4 solid or ½″ diameter semi-flexible.
- Supply packages Universal wound, 4″ diameter, 4″ traverse, on cones 4¼″ long, 1⅞″ hole at base; three point wind.
- Maximum power requirement ½ H.P. including power transmission equipment.
- Individual motor-drive furnished upon request.
- Stands furnished to take reels as follows:

  30″ diameter, 10½″; 13″; or 16″ outside width.
- Reels are not included with the machine.

Complete detailed information on "WARDWELLIAN" Type D Serving Machine on Request

There are nearly thirty different applications for Wardwell equipment, including Braiding, Shielding with wire, Tape Serving, Yarn Serving, Asbestos Serving, Paper Serving, Armor Serving and Resistance Wire Serving.

WARDWELL BRAIDING MACHINE CO.

Central Falls Rhode Island, U.S.A.

Representatives for Europe, British Colonies and Dependencies

JAMES MACKIE & SONS, LTD., BELFAST, IRELAND

Bulletin on Temperature Control Instrument

The Winslow Company, 9 Liberty St., Newark 5, N. J. manufacturers of indicators, testing equipment and special industrial apparatus, have announced a new bulletin describing the "Winslow Truetemp Input Controller."

★ ★ ★

The Truetemp Input Controller is an instrument which is added to any existing "on-off" temperature control system that is thermocouple actuated, to provide furnace or heating temperature control as close as ±0.2°F. Heat processing is thereby improved and losses from rejects or off-quality products are reduced.

★ ★ ★

The bulletin details the theory of Truetemp's operation, explaining how deviations as high as ±30°F. from the desired heating temperature can occur with present industrial temperature control systems. Truetemp eliminated such deviations by setting up a dynamic control point that anticipates and prevents under or over shooting. Thus, by addition of Truetemp, a heat processer can achieve laboratory type accuracy with present equipment to meet more rigid processing standards.

★ ★ ★

Send for Bulletin No. 654 for added details.

Chase to Expand in Cleveland

Chase Brass & Copper Co., Inc., subsidiary of Kennecott Copper Corp., has announced plans for a $4 million expansion of plant and manufacturing facilities at its Babbitt Road Plant in Cleveland, Ohio.

Electronic Blanket Control

An unusual property of nickel—its electrical resistivity increases rapidly as temperatures rise—has made the metal useful for the "feeler" wire that acts as a temperature control in electronic blankets.

Outstanding Personalities of the Wire Industry

G. Whitfield Richards Appointment

The above company of 1732-36 Carlton Street, Philadelphia, Pa., announces that **Robert K. Townsend,** formerly with **Revere Copper & Brass, Inc.** has rejoined their technical staff.

★ ★ ★

He will be remembered well in his earlier association with us for many years.

★ ★ ★

Mr. Townsend is a graduate, M. Sc., University of Leeds, England and has a wide experience in metal working lubricants and processes.

Apex Alkali Adds to Pittsburgh Staff

To increase their service, **Apex Alkali Products Company** of Philadelphia have added **Henry H. Wallace** to their sales staff.

★ ★ ★

Mr. Wallace will work out of the Pittsburgh area, handling the Apex Line of Wire Drawing Lubricants, Cleaning Compounds and Cutting Compounds.

★ ★ ★

He is a graduate of Washington and Jefferson College and has over a dozen years of experience in the metal field, having been with the Ordnance District in Pittsburgh for six years and the balance of the time with a company specializing in lubricants and cleaning compounds.

Henry H. Wallace

New President of Crucible Steel Elected

Joel Hunter has been elected president of **Crucible Steel Company of America,** Pittsburgh, Pa., to succeed **William H. Colvin.**

★ ★ ★

Mr. Colvin, retiring from active business life, continues as a member of the executive committee and as a director.

★ ★ ★

Mr. Hunter joined Crucible in 1951 as vice president-finance and was elected a director and executive vice president in 1953.

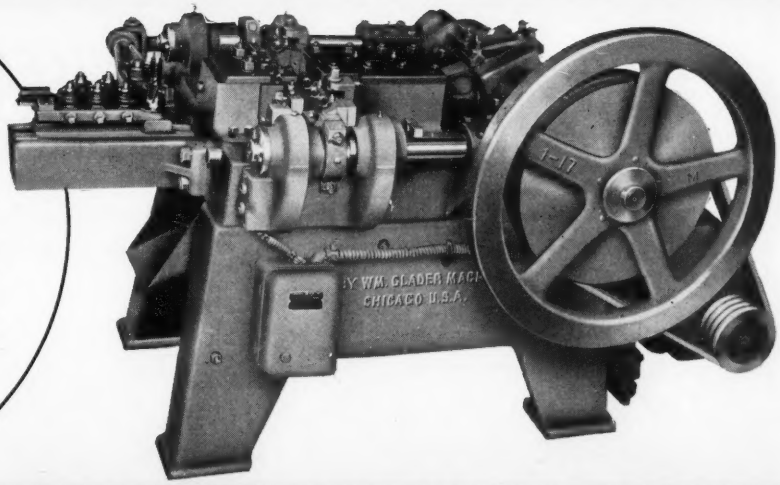
GLADER

HIGH SPEED WIRE NAIL MACHINES

HIGH TONNAGE OUTPUT—LOW MAINTENANCE COST

You can take care of increased production schedules and better product demands with these machines of established reputation.

For 55 years GLADER MACHINES have been giving HIGH QUALITY, LOW COST nail production.



Wm. Glader Machine Works 210 N. Racine Avenue Chicago 7, Illinois

Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

CAMDEN WIRE CO., INC.

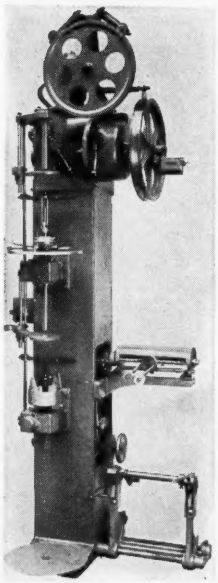
Wire Fabricators

MANUFACTURERS OF BARE, TINNED AND SILVER PLATED STRANDED COPPER WIRE, CONCENTRIC OR BUNCHED

40 Masonic Avenue • Camden, New York

FINE WIRE COVERING—AT HIGHEST SPEEDS ...WITH THE POURTIER INSULATING AND TAPING MACHINES

NOW SOLD AND SERVICED EXCLUSIVELY BY FIDELITY



It is our privilege to be named exclusive U. S. distributor for The Pourtier High-Speed Insulating and Taping Machines, product of the famous Pourtier Pere & Fils of France.

Write for more information . . . or see The Pourtier Insulating and Taping Machine in operation in the showrooms at our plant.

Designers and Builders of Intricate, Automatic Precision Machines

SINCE 1911

FIDELITY MACHINE COMPANY, INC.

3908 - 18 FRANKFORD AVENUE, PHILADELPHIA 24, PA.

Veteran Sales Executive Retires

Lew E. Wallace, assistant vice president in charge of sales for **The Youngstown Sheet and Tube Company** retired on May 31st., after 39 years of service.

★ ★ ★

He joined The Youngstown Sheet and Tube Company's sales department on Sept. 15, 1915. Shortly after the United States entered World War I he enlisted in the army. He attended engineering school in Washington and was assigned to the Ordnance Department as an inspector of shell material with the rank of captain.

★ ★ ★

In 1918 he was assigned to the company's Chicago sales office and five years later was transferred to the sales office in Cleveland. On Jan. 1, 1926 he became district sales manager at Detroit and in October 1928 was called into the company's general offices as assistant manager of pipe sales.

★ ★ ★

Mr. Wallace went to New York in 1933 as district sales manager and held that post until he was called back to Youngstown in April, 1949 as general manager of sales. Last August he was elected assistant vice president in charge of sales.

Honeywell Names New Managers

The appointment of two new branch managers and the creation of a new district managership at Greensboro, N. C. is announced by **Minneapolis-Honeywell Regulator Company.**

★ ★ ★

Merritt Eusey, former head of the company's Baltimore branch, has been named to head the Pittsburgh office, succeeding **Ray Weikel** who has assumed a supervisory position with Honeywell's Industrial Division in Philadelphia.

★ ★ ★

Robert S. Warnick, formerly a supervisory commercial salesman in the Philadelphia office, has succeeded Eusey as branch manager in Baltimore.

★ ★ ★

Donald H. Hannasch has been appointed to the newly created position of district manager at Greensboro. The office formerly was under the direct supervision of the Charlotte office. Hannasch has been resident salesman at Rochester, Minn.

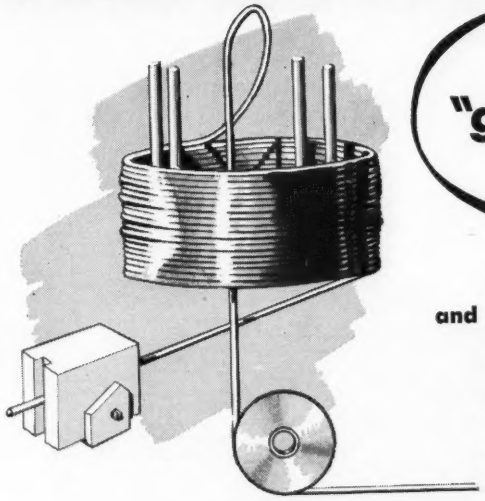
Carboloy Names Department Manager

Edgar W. Engle, manager of product and process development engineering, **Carboloy Department of General Electric Company,** Detroit, has been named manager of cemented carbide products engineering.

★ ★ ★

Mr. Engle has been active in manufacturing and developing cemented carbides since he came to Carboloy in June, 1941, as a foreman. He became metal department foreman in 1945; manager of process engineering in 1950, and manager of product and process development engineering in 1952. He received a B.S. degree in mechanical engineering from Massa-

DURPON* DRAWING COMPOUNDS



don't "get tired" easily

Initial performance is high, and they keep it twice as long!

Many soap lubricants for wire-drawing non-ferrous metals work well enough "the first time around." How well they perform when recirculated is another matter—which has a strong influence on the life of your expensive dies.

It's no accident that Nopco Durpon Drawing Compounds have double the effective life of ordinary drawing compounds. They are designed to have just that. A special additive prevents contamination of the effective drawing ingredients by dirt and by metallic particles . . . maintains the normal balance between soap and lubricant during re-circulation.

You gain two important economies from this lengthened stability. Nopco Durpon Drawing Compounds last longer . . . so do your dies.

All three types, Durpon, Durpon L and Durpon FW are natural lubricants; all are on the alkaline side (pH 8.0 to 10.5). Write today for technical bulletins and testing samples.

"stay stable longer"
DURPON for intermediate wire
DURPON L for rods, tubes, and heavy wire
DURPON FW for fine wire

*Reg. U. S. Pat. Off.

NOPCO
CHEMICAL COMPANY, Harrison, N. J.
BOSTON • CHICAGO • CEDARTOWN, GA. • RICHMOND, CAL.

chusetts Institute of Technology in 1941.

To Head Electric Auto-Lite

James P. Falvey, who was appointed executive vice president on May 5 following the death of **Royce G. Martin,** former chairman of the board and president, has been elected president of The Electric Auto-Lite Company.

★ ★ ★

The new president of Auto-Lite joined the organization in 1934 and became closely associated with the late Mr. Martin, particularly in the field of employee relations. He has been vice president in charge of this activity and has directed the company's legal department for eleven years. He is also a member of the board of directors.

★ ★ ★

Mr. Falvey was born in Detroit on October 1, 1904. Educated in local schools and the University of Detroit, from which he was graduated in 1927 with a law degree, he came to Auto-Lite from the Moto-Meter Gauge and Equipment Corporation, when that company was acquired by Auto-Lite twenty years ago.

★ ★ ★

As president of Auto-Lite, world's largest independent manufacturer of automotive electrical equipment, he becomes chief executive officer of a vast industrial organization embracing thirty plants in the U. S. and Canada and nearly 30,000 employees.

ASTM Elects New Officers

The American Society for Testing Materials has announced the election of officers for 1954-1955 at its 57th Annual Meeting in Chicago, June 13th to 18th. These are:

PRESIDENT: Norman L. Mochel, Manager, Metallurgical Engineering, Westinghouse Electric Corp., Philadelphia, Pa. (1 year).

VICE PRESIDENT: Rudolph A. Schatzel, Vice President and Director of Engineering, Rome Cable Corp., Rome, N. Y. (2 years).

DIRECTOR: Edward J. Albert, President, Thwing-Albert Instrument Co., Philadelphia, Pa. (3 years).

DIRECTOR: John M. Campbell, Administrative Director, Research Laboratories, General Motors Corp., Detroit, Mich. (3 years).

DIRECTOR: Paul V. Garin, Engineer of Tests, Southern Pacific Co., San Francisco, Cal. (3 years).

DIRECTOR: John H. Jenkins, Chief, Forest Products Labs. of Canada, Ottawa, Can. (3 years).

DIRECTOR: Douglas E. Parsons, Chief, Bldg., Technology Div., National Bureau of Standards, Washington, D. C. (3 years).

Elected Vice President and Research Manager by International Nickel

Frank L. LaQue has been elected vice president of the **International Nickel Company, Inc.,** and manager of its development and research division, **Henry S. Wingate,** president, has announced. A distinguished authority on corrosion, Mr. LaQue succeeds in both positions **Thomas H. Wickenden,** who has attained retirement age but will continue to serve the company as a consultant on special projects.

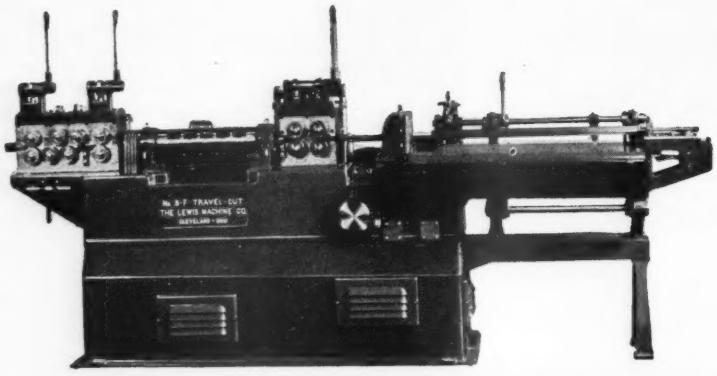
★ ★ ★

O. B. J. Fraser and **Donald J. Reese** will serve as the assistant managers of the division.

Fast, Accurate, Economical

STRAIGHTENING and CUTTING

with LEWIS TRAVEL-CUT



22 Models to handle from .012" to ¾" Round, Hex, Flat, Shapes.

Simple in design, rigid in construction, Lewis TRAVEL-CUT will deliver continuous dependable service under the most severe, high production conditions—day in, day out. Feeds wire from the coil, straightens accurately, gauges to uniform length, and cuts clean without stopping the wire. For steel, brass, aluminum and alloy wire. Cut your cutting costs with the Lewis TRAVEL-CUT. Full details on request.

Exclusive Representatives

EAST: Penn Machinery Co., 117 North Third Street, Philadelphia 6, Penn.

MIDDLE WEST: Steel & Wire Machinery Co., 15457 Euclid Ave., Cleveland 12, O.

CENTRAL: Moslo Machinery Co., 2443 Prospect Avenue, Cleveland 15, Ohio.

WEST COAST: Hoffman & Heartt, 3005 So. Grand Ave., Los Angeles 7, California.

CANADIAN: Empire Engineering Co., 738 Dundas St., East, Toronto, Ont., Canada.

CONTINENTAL EUROPE: Gaston E. Marbaix Ltd., Devonshire House Vicarage Crescent, London S. W. 11, England.

The LEWIS MACHINE Company

3441 E. 76th Street, Cleveland 27, Ohio

Also agents in Paris, Stockholm, Rotterdam, Brussels, Zurich, Milan, Bombay and Melbourne

At the same time, Mr. Wingate stated that the company's product development and research program, which over the years has helped nickel to attain its present position in industry, will be pushed intensively to keep pace with quickened scientific and technological progress.

AS&W Appoints Boston Manager

Announcement of the appointment of **Frank T. Clarke** as manager of sales of **American Steel & Wire Division's** District Sales offices in Boston was made recently by **Ross F. Curtis,** Eastern Area manager of sales of this United States Steel unit. In this advancement, Mr. Clarke returns to his native Boston where he succeeds **A. N. Murdock,** who retired on May 31st.

★ ★ ★

He joined American Steel & Wire there in 1921 as an office assistant in the warehouse. He held various posts until 1930, when he was promoted to salesman in the manufacturers' department. In 1940, he was transferred to the New York City sales offices as assistant manager.

★ ★ ★

Promoted to director of cold rolled strip sales in 1947, he spent the following two years in Cleveland. In 1949, he was named manager of manufacturers' products in New York—the position he held at the time of this promotion.

G.E. Appoints Department Manager

Arthur C. Treece has been appointed Manager-Marketing of **General Electric Company's** Laminated and Insulating Products Department, according to **William L. Rodich,** General Manager of that department.

★ ★ ★

Mr. Treece joined General Electric in 1922 at Fort Wayne. In 1937, he was made district sales manager of the Plastics Department's Chicago office, and was transferred to the Plastics Department in 1945 as manager of the Pittsfield Molded Products Plant. His headquarters will be at Coshocton, Ohio.

Engineer Joins Lindberg

Lindberg Engineering Company announces the appointment of **E. B. Jones** as Chief Engineer in charge of estimating and engineering, in Lindberg's newly formed "Field-erected Equipment Division." The new division has been formed to expand facilities for specializing in large, field erected industrial furnaces, special machines and complete production lines.

★ ★ ★

Mr. Jones received his engineering education at the University of Kentucky and has twenty-five years experience in this specialized furnace field where he has served in a management capacity. He recently resigned from **Continental Industrial Engineers Inc.**

Elected to Board of Loewy-Hydropress

Ernest E. Kugel, Director of Rolling Mill Sales, **Hydropress, Inc.,** who has been with Erwin Loewy, President of the company, for over 25 years, has been elected a member of the Board of Directors.

Standardize on ACROPAK* Spools!

Only ½ the Weight!

YET STRONG, TOUGH, RIGID . . *LONGER LIFE*

ACROPAK Spools will help you cut wire packaging costs because they give longer service, require less maintenance and cost less to ship. They're strong. They'll take repeated shippings and still run true on the arbor. They're machined to close tolerances. You can run them at high production speeds with fewer snags, less toe-out and minimum end breakage.

- Light Weight
- Precision built
- Reduced cost
- Longer life
- Extra strength
- Dynamic balance
- Greater production
- Low cost reconditioning
- Less maintenance
- Attractive packaging

THEY CUT YOUR SPOOLING COSTS

Best proof of ACROPAK superior performance are the millions of these spools now used by the biggest names in the wire industry. We've proved it to them—let us prove it to YOU.

★ We also make a complete line of heavy-duty shop processing STEEL SPOOLS built to the same high standards of accuracy and rigidity as the famous Acropak aluminum spools.

ACROMETAL PRODUCTS INC.
Division U S Bobbin and Shuttle Co., 616 Fifth Street N., Minneapolis 1, Minn.

G.E.'s Chemical Materials Department Announces Appointments

John M. Witzel has been named Supervisor—Electrical Insulating Materials Unit of **General Electric Company's** Alkyd Products Engineering Section, Chemical Materials Department, it was announced recently by **Dr. John A. Loritsch,** manager of Alkyd Products Engineering, Schenectady, N. Y.

★ ★ ★

Dr. Witzel, a graduate of Dartmouth College, received his PhD in Chemistry at Cornell University. A native of New York State, he came with General Electric in 1948 as a Product Engineer in the Chemical Division's Schenectady Plant. In 1950 he was appointed Group Leader and later Supervisor of the Advance Development Engineering Unit for Alkyd Products Engineering, which position he has held until his present appointment.

★ ★ ★

At the same time it was announced that **Robert B. Young** has been appointed Supervisor, Advance Development Unit of Alkyd Products Engineering. He is a native of Kentucky, having graduated from the University of Kentucky and receiving his PhD in Chemistry from Michigan State College. He joined General Electric in 1943 as a Research Chemist and in 1953 became Supervisor of the Methylon Resin Development Unit, a position he has held until his present appointment.

Canadian Companies Acquired by Salem-Brosius to be Merged Into Single Unit

Appointment of **Frederick E. Coombs** of Toronto, Canada, as assistant to the president in charge of operations of **H. L. Hall, Corp., Ltd., Holbeck Corp., Ltd.,** and affiliated companies of Toronto has been announced by President **Ward A. Wickwire, Jr.**

★ ★ ★

The Canadian engineering companies recently acquired by **Salem-Brosius, Inc.,** of Pittsburgh, will be consolidated into a single operating company in the near future. Salem-Brosius, Inc., also headed by Mr. Wickwire, is an internationally known producer of furnaces, heat treating equipment and other products for the steel and non-ferrous industries.

Carboloy Names Distributor

Austin Ford Logan, Inc., Buffalo, N. Y. has been named an authorized distributor for **Carboloy Department of General Electric Company,** Detroit.

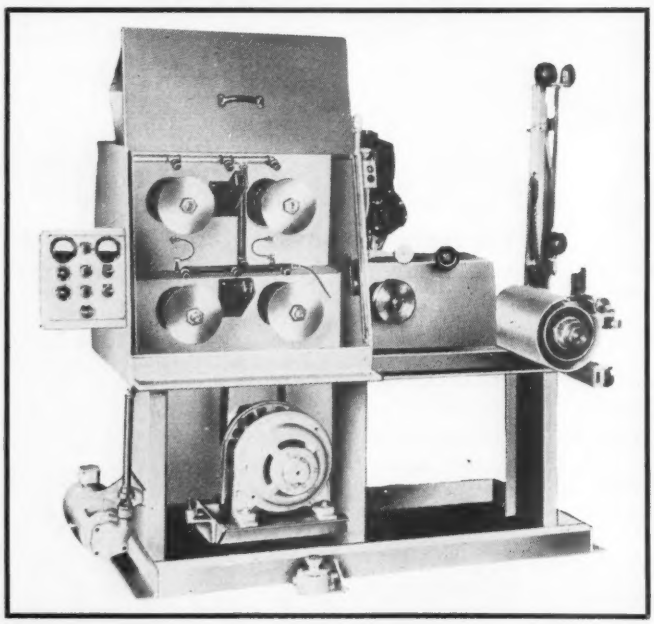
★ ★ ★

The organization will carry the Department's entire line of standard cemented carbide tools and blanks, carbide-tipped masonry drills and diamond wheel dressers.

Brazilian Company Officials Studying Firth Sterling Methods

Dr. Vicente Chiaverini and **Dr. Luiz C. Correa Da Silva,** General

Meet "Model F-31"—*an artist at drawing* FINE WIRE!



SPECIFICATIONS:

- Maximum Wire Entering Size.....#14 B & S Gauge
- Finished Wire Size.....#26 to 34 B & S Gauge
- Operating Speed.....5,000 ft. per minute
- No. of Dies.....16 • Motor Size..15HP
- Size of Die Case, 1" x ½" thick
- Spool Capacity.....40 lbs.
- Net Weight .....Approximately 2,900 lbs.

Model F-31 is unique in the respect that it is designed with an over driven spooler, viz. no slip and consequently no wear on the finishing capstan. Pre-set tension of the spooler eliminates scuffing and splintering of the finished wire.

The spooling unit (driven from the main unit) is equipped with a clutch control which maintains uniform wire speed throughout entire spooler build-up. Wire tension regulation can be done while the F-31 is running. The unique design and simple operation of this FINE WIRE DRAWING MACHINE insures ease of string-up and low maintenance cost.

Inquiry By Phone or Letter is Cordially Invited

COOK *MANUFACTURING COMPANY*

50 EAST 25th STREET • PATERSON, NEW JERSEY • ARMORY 4-6380

Manager and Production Manager of the newly formed **Brassinter S. A.**, are now in Pittsburgh for the purpose of studying **Firth Sterling** processes and manufacturing methods involved with the production of sintered tungsten carbides and tool steels. This company is to eventually become the counterpart of Firth Sterling in Brazil. The present mission of Drs. Chiaverini and Da Silva includes the actual purchase of equipment from U. S. manufacturers required for the installation of manufacturing facilities in Sao Paulo.

★ ★ ★

On their return to Brazil, Drs. Chiaverini and Da Silva will start immediately to set up Brassinter's production facilities, first on carbides then on steel, based on Firth Sterling techniques. It is expected that Brassinter's output will eventually meet the fast growing Brazilian demand for cutting tools and dies. Brazilian industrial activity is undergoing rapid expansion due to mechanization of coal mines and exploitation of other natural resources. As further evidence of industrial expansion, Brazil has one of the largest automobile assembly plants outside of the United States and the largest steel plant in South America, Volta Redonda. Eventually parts for electric motors, transformers, automobiles, farm equipment, trucks and household appliances sold in Brazil are being and will be manufactured there.

★ ★ ★

Brassinter S. A. has announced three officers: **Prof. Dr. Ary Torres,** President; **Dr. Francisco Matarazzo Neto,** Vice President; and **Dr. Vicente Chiaverini,** General Manager.

Lindberg Sets Up New Division

Lindberg Engineering Company, Chicago, Illinois, announces the appointment of **L. H. Remiker** to head up its newly formed "Field-Erected Equipment Division." The new division has been formed to expand Lindberg's existing facilities for specializing in large, field erected industrial furnaces, special machines, and complete production lines. Field engineers in twenty-one Lindberg offices throughout the country will give complete on-the-spot service from planning right through installation. All fabrication will be done in Lindberg's own plants, a one-package operation that eliminates dependence on outside suppliers.

★ ★ ★

Mr. Remiker has been with Lindberg for the past nineteen years serving in the capacity of Chief Engineer.

James Oakes

The Sankey Green Wire Weaving Co., Ltd., Thewald, Warrington, Lancashire, England, have announced with propound regret the passing of **James Oakes,** founder, chairman and managing director of their company.

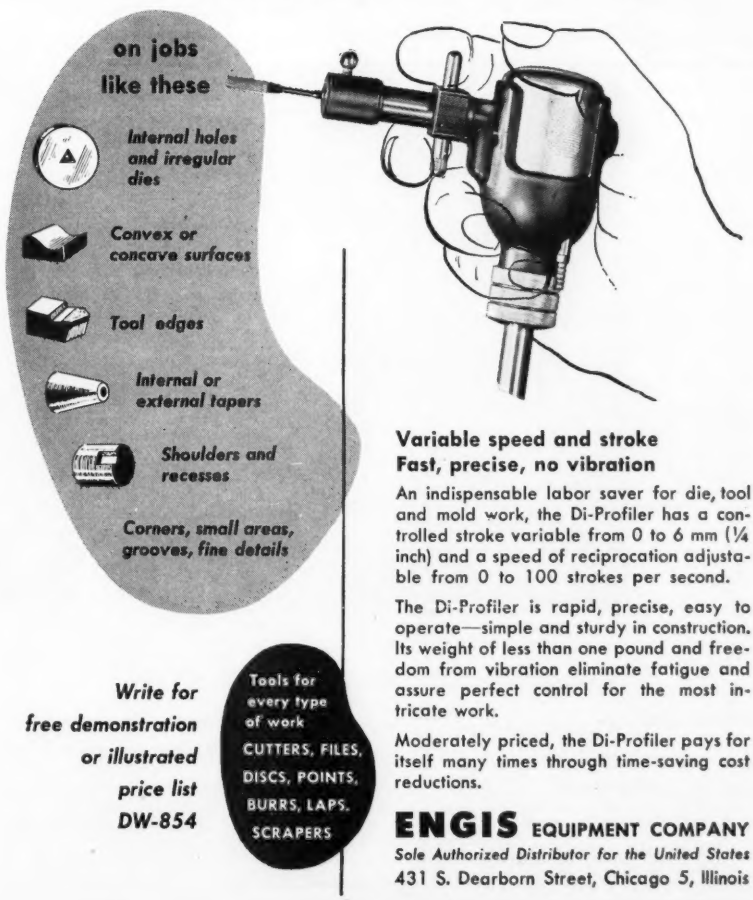
★ ★ ★

Mr. Oakes died after an illness of some weeks duration, on May 15, 1954, and was interred in the Grapenhall Parish Churchyard, Grapenhall, Warrington, following a private service in his home.

THE **Di-Profiler**

RECIPROCATING HAND MACHINE

for time-saving cutting—roughing—finishing


on jobs like these
Internal holes and irregular dies
Convex or concave surfaces
Tool edges
Internal or external tapers
Shoulders and recesses
Corners, small areas, grooves, fine details

Variable speed and stroke
Fast, precise, no vibration

An indispensable labor saver for die, tool and mold work, the Di-Profiler has a controlled stroke variable from 0 to 6 mm (¼ inch) and a speed of reciprocation adjustable from 0 to 100 strokes per second.

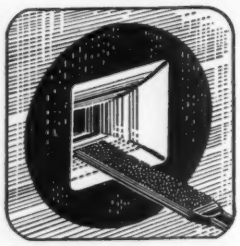
The Di-Profiler is rapid, precise, easy to operate—simple and sturdy in construction. Its weight of less than one pound and freedom from vibration eliminate fatigue and assure perfect control for the most intricate work.

Moderately priced, the Di-Profiler pays for itself many times through time-saving cost reductions.

Write for free demonstration or illustrated price list DW-854

Tools for every type of work
CUTTERS, FILES, DISCS, POINTS, BURRS, LAPS, SCRAPERS

ENGIS EQUIPMENT COMPANY
Sole Authorized Distributor for the United States
431 S. Dearborn Street, Chicago 5, Illinois

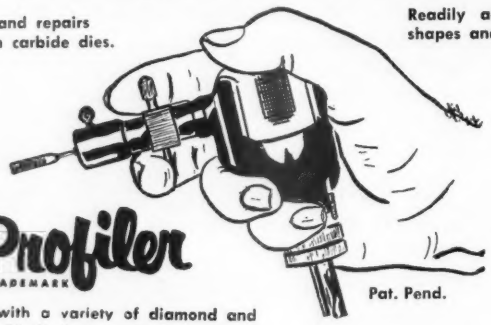


90% of TIME SAVED

that would normally be used to make a die maker's special files, chisels, scrapers, etc.

Makes and repairs tungsten carbide dies.

Readily adapts to special shapes and contours.



SHARPENS
GRINDS
FILES
SCRAPES
HONES
LAPS
SAWS
STONES
CUTS
FINISHES
POLISHES

the * **Di-Profiler** TRADEMARK Pat. Pend.

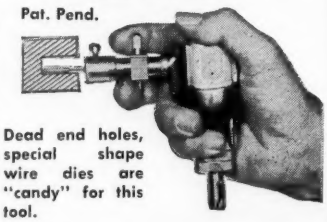
is furnished with a variety of diamond and needle files, chisels, burrs and other units of many intricate shapes, thereby reducing the tool and die maker's problem of special tools (made on your time) by 90%.

The *Di-Profiler can be used for repairing dies, even without removing from machine. You can hold your files absolutely level for straight holes and provide an oscillating motion for contour. The reciprocating action does the work at a stroke ranging from 0" to ¼", without vibration because of the high precision of the tool. Once you see it—you'll never be without the *Di-Profiler. Write for full details and ask for a demonstration.

SAVE YOUR TOOL MAKERS AND MAINTENANCE MEN BY PROVIDING TOOLS TO DO THE HARD, TIRING PART OF THEIR WORK.

*DI-PROFILER ELIMINATES THE HARD "ELBOW GREASE" WORK.

Pat. Pend.



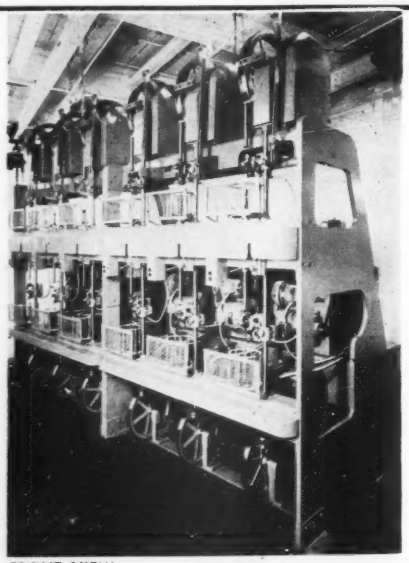
Dead end holes, special shape wire dies are "candy" for this tool.

Everything comes in an attractive mahogany finished box — except the flexible shaft, rotary attachment and motor.

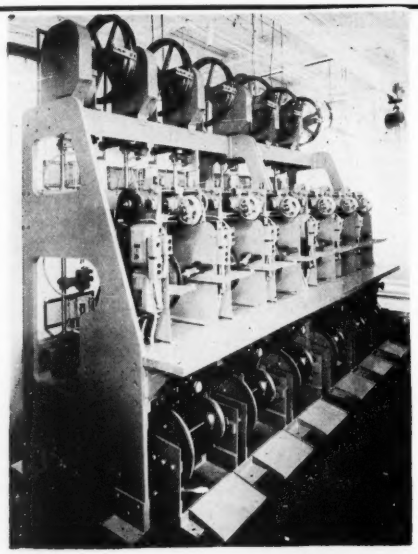
Nord International Corp.

449-W CENTRAL AVENUE, ORANGE, NEW JERSEY

*An exclusive Nord Trade Mark



FRONT VIEW



REAR

EST. 1855 AIMco INC. 1915

3D-6-MBB TAPING MACHINE #1107

Applies double cover to 6 lines of wire simultaneously. Nominal wire range #6 to #18 B & S gauges (.162" to .040" or 4.116 MM to 1.024 MM). Standard Capstans 24" in diameter. Supply wire let-offs and torque motor driven take-ups for 24" diameter reels are at rear of machine.

"American" AIMCO INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

FAIRHILL AND HUNTINGDON STREETS

PHILADELPHIA 33 PENNSYLVANIA U.S.A.

A Review of Recent Wire Patents

No. 2,679,680, WIRE-COURSING DIE, patented June 1, 1954 by Arthur H. Hanks, Dunkirk, N. Y., assignor to Allegheny Ludlum Steel Corporation, a corporation of Pennsylvania.

A cone-shaped, open-end bore converging towards a front end thereof with a cone-shaped front face sloping upwardly-backwardly from the front end of the bore and defining a continuous cutting edge forwardly of the die, and a number of peripherally-inclined and spaced-apart longitudinally-extending coursing projections within the bore and extending backwardly therealong.

★ ★ ★

No. 2,679,708, FISHHOOK, patented June 1, 1954 by Herbert E. Matthes, St. Paul, Minn.

A double shank is provided with a guard portion at the hook. The entire structure comprises a single length of heavy wire.

★ ★ ★

No. 2,679,774, METHOD OF MAKING LOCK BOLTS, patented June 1, 1954 by Roderic A. MacDonald, Greenwich, Conn., assignor to Russell, Burdsall and Ward Bolt and Nut Company, Port Chester, N. Y., a corporation of New York.

This method comprises providing a shank having a portion of largest diameter adjacent one end, and intermediate portion of an intermediate diameter and the opposite end portion of smallest diameter, and rolling threads on the portions of smallest diameter and intermediate diameter to produce normal threads on the portion of smallest diameter and a plurality of threads having extensions at their crests on the portion of intermediate diameter.

★ ★ ★

No. 2,679,823, WIRE COATING APPARATUS, patented June 1, 1954 by Robert H. Denham, Scotia, N. Y., assignor to General Electric Company, a corporation of New York.

A sealing fluid is disposed within the coating material receptacle surrounding the entrance mouth for the wire. This fluid prevents escape of the coating fluid.

★ ★ ★

No. 2,680,253, SPRING ASSEMBLY UNIT, patented June 8, 1954 by William W. Gleason, Chicago, Ill., assignor to Nachman Corporation, Chicago, Ill., a corporation of Illinois.

Invention resides in the clips connecting adjacent wire coil springs together and to the rods.

★ ★ ★

No. 2,680,321, DOUBLE HOOK FISH LURE, patented June 8, 1954 by Owen D. Premo, Muskegon Heights, Mich.

The hooks and their connection are of wire.

★ ★ ★

No. 2,680,393, METHOD OF MAKING TACKS, patented June 8, 1954 by Robert Vincent, Howell, Fort Worth, Tex., assignor to Tok, Inc. Amarillo, Tex., a corporation of Texas.

A method is disclosed for making strip tacks from wire.

★ ★ ★

No. 2,680,394, WIRE CUTTING AND STRIPPING MACHINE, patented June 8, 1954 by Karl H. Andren, Greenfield, Wis., assignor to Artos Engineering Company, Milwaukee, Wis., a corporation of Wisconsin.

A single reciprocable clamp is provided for feeding insulated wire stock longitudinally through a cutting and stripping zone to feed several successive lengths of the stock within the limits of travel of the clamp between each successive cutting and stripping operations.

★ ★ ★

No. 2,680,644, APPARATUS FOR HANDLING COILED MATERIAL, patented June 8, 1954 by John A. Marconi, Hobart, Ind., assignor to United States Steel Corporation, a corporation of New Jersey.

More specifically, the apparatus is for moving a bundle of coiled wire and the like, having an axial opening, from a first position wherein the opening is directed vertically, to a second position wherein the opening is directed horizontally.

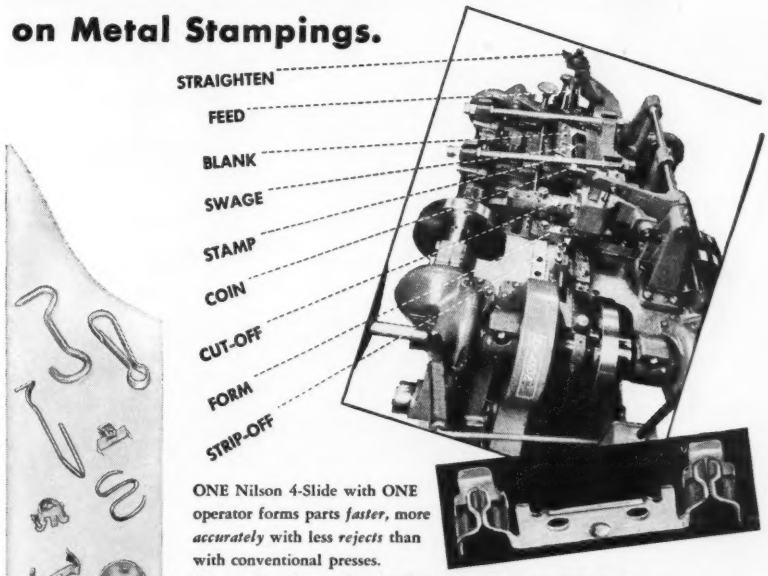
★ ★ ★

No. 2,680,710, METHOD AND APPARATUS FOR CONTINUOUSLY ELECTROPLATING HEAVY WIRE AND SIMILAR STRIP MATERIAL, patented June 8, 1954 by Herbert Kenmore and Walter J. Manson, New York, N. Y., assignors to Kenmore Metal Cor-

FORMED COMPLETE-*AUTOMATICALLY!*

NILSON FOUR-SLIDES

Combine Operations to Lower Costs on Metal Stampings.



ONE Nilson 4-Slide with ONE operator forms parts *faster*, more *accurately* with less *rejects* than with conventional presses.

Elimination of secondary handling, lower tooling and set up costs *means added profits*. Wide range of models for wire and ribbon metals. Feed lengths to 32", stock widths to 3½". Press capacity to 75 tons.

For specific recommendations — send details of your operation.

THERE'S NOTHING LIKE A NILSON

Write, Wire, Phone for full particulars.

THE A. H. NILSON MACHINE COMPANY

1516 Railroad Avenue • Bridgeport 5, Connecticut

Automatic Chain-Making Machines • Automatic Staple Forming Machines • Wire and Stock Reels • Foot Presses • Wire Straightening Equipment • Slide Feeds for Presses

poration, New York, N. Y., a corporation of Delaware.

There are eleven claims in this patent. The method is said to be adapted to plating wire having a cross sectional area at least equivalent to that of a round wire of 75 mils diameter to continuously produce a plated wire which is capable of being drawn after plating without rupturing or removing the plate.

★ ★ ★

No. 2,681,084, FORMER HEAD FOR BARBED WIRE MANUFACTURING MACHINE, patented June 15, 1954 by Ivan L. Sommerville, Channelview, Tex.

The head is adapted for forming and affixing the barb elements to wire to form barbed wire.

★ ★ ★

No. 2,681,085, APPARATUS FOR CHANGING THE CONFIGURATION OF THE END CONVOLUTIONS OF SPRING COILS FOR CUSHIONS, MATTRESSES, AND THE LIKE, patented June 15, 1954 by David I. Levine, Swampscott, Mass., assignor to Spring Unit Development Co., Lynn, Mass., a partnership composed of David I. Levine, Sara Lisson and Anne Melen, as copartners.

A coil-engaging pin eccentrically mounted on a rotatable member is adapted to bend a portion of the end convolution of the coil to a desired position.

★ ★ ★

No. 2,681,184, WIRE TENSION CONTROL, patented June 15, 1954 by Lewis C. Thomas, Oklahoma City, Okla.

There are seven claims. A pulley, mounted upon a carriage, engages an intermediate portion of the wire to tension it.

★ ★ ★

No. 2,681,187, COIL SUPPORTING RACK, patented June 15, 1954 by Gerhard J. Zettelmeyer, Cleveland Heights, Ohio, assignor to United States Steel Corporation, a corporation of New Jersey.

A hook adjustably carried at the free end of a rack arm may be positioned for selectively adjusting the hook to one position for receiving a coil of wire from a point above a rack and guiding the same onto the rack arm, and to another position coaxial with the rack arm for receiving a predetermined number of convolutions of a coil supported on the rack arm.

★ ★ ★

No. 2,681,447, MACHINE FOR CRIMPING ELECTRIC CONNECTOR MEMBERS ON THE ENDS OF WIRES, patented June 22, 1954 by Stafford E. Davis, Newton, Mass., assignor to Ark-Les Switch Corporation, Watertown, Mass., a corporation of Massachusetts.

Special devices are provided whereby the wire is oriented so as to be directly in the path of a descending die which cooperates with a stationary die.

★ ★ ★

No. 2,681,544, CABLE STRANDING MACHINE, patented June 22, 1954 by Carl O. Bruestle, Metuchen, N. J., assignor to Syncro Machine Company, Perth Amboy, N. J., a corporation of New Jersey.

The assembly includes a rotatable stool cradle having a pair of side members, a pair of rotatable spoon supporting pintle assemblies, one fixed to one side member and the other slidably mounted on the other side member, means for clamping the latter in the side frame member, a tubular tension bar interconnecting the pintle assemblies, and a control device lying in part in the tubular tension bar for initiating stoppage of the machine in the event the tension bar breaks or becomes loose.

★ ★ ★

No. 2,682,296, SEAT BOTTOM SPRING, patented June 29, 1954 by Maurice Stubnitz, Adrian, Mich., assignor to Stubnitz-Green Spring Corporation, Adrian, Mich., a corporation of Michigan.

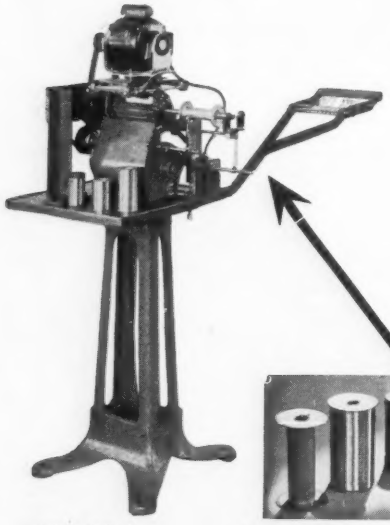
The forward frame member is made up of three wires, i. e., a forward border wire, an intermediate trim wire to which the trimming may be clipped, and a rear reinforcing wire with safety pin springs clipped to the rear reinforcing wires.

★ ★ ★

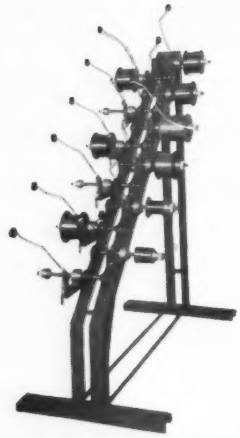
The information in this section is furnished by the patent law offices of LANCASTER, ALLWINE & ROMMEL, 438 Bowen Bldg., Washington 5, D. C. Data listed is only a brief review of recently issued patents obtained by various U. S. Pat. Off. registered attorney for manufacturers and/or inventors. Complete copies may be obtained direct from Lancaster, Allwine & Rommel by sending 50¢ for each patent desired. Outside of the U. S. and Canada the cost is $1.00 for each copy.

STANDARD UNI-DRIVE WIRE WINDER.

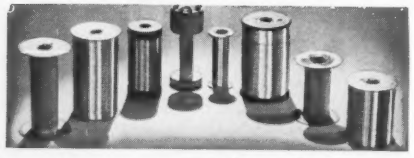
INCREASE YOUR PRODUCTION
WITH THIS WINDER



Wire Winder



Pay-off Attachment



Various types of supply packages that may be wound on Standard Uni-Drive Wire Winder.

PAYOFF

Our payoff attachment is made with self-aligning ball bearings and a compensating attachment to control the tension of each end. Applies same tension when spool is empty as when full.

The new Uni-Drive Winder with Payoff Attachment is new in design and incorporates several improved and tested features. Production is stepped up through increased speed. It produces smooth, even and accurately wound spools of wire in single or multiple ends. All strands parallel—no over or under-winding. Automatic Stop-Motion controls each strand. Compensating attachment produces perfectly controlled tension. Traverse adjustable from 1¾" to 5½" between spool heads without changing cam. Designed especially for winding wire to be braided and shielded for electrical conductors up to ¾" diameter.
Payoff can be equipped with Carboloy Guide Inserts at additional cost.

STANDARD MILL SUPPLY COMPANY
PAWTUCKET, RHODE ISLAND, U.S.A.
1064-1080 Main St.
PAwtucket 3-1534 — 3-1535 — 3-1536

No. 2,682,335, STRIP HANDLING MACHINE, patented June 29, 1954 by Herbert Frazer Welsh, Philadelphia, Douglas Cary Wendell, Jr., Bryn Mawr, and Theodore H. Bonn, Philadelphia, Pa., assignors, by mesne assignments, to Remington Rand Inc., New York, N. Y., a corporation of Delaware.

A strip-handling device is disclosed comprising a pair of superposed pivotally connected frames, a strip-receiving cylinder rotatably mounted in each frame, one of these frames being adjustable to permit the axes of the cylinders to be relatively adjusted in parallel planes at a skew angle.

Safety Congress to Meet in Chicago

The 42nd National Safety Congress and Exposition, to be held Oct. 18-22, Chicago, Ill. Sessions on industrial safety scheduled for Conrad Hilton, Congress, Morrison and La Salle hotels; traffic safety sessions at Congress hotel; commercial vehicle and transit safety sessions at La Salle hotel; farm safety sessions at Palmer House; school safety sessions at Morrison hotel, and home safety sessions at Conrad Hilton hotel. For further information write **R. L. Forney,** general secretary, **National Safety Council,** 425 N. Michigan Ave., Chicago 11, Ill.

New Trade Name Index Published

Industrial Diamond Trade Names Index, 5th Ed., 1954. Compiled jointly by Industrial Diamond Information Bureau and Industrial Diamond Review, 124 pp, 8¼ x 5½ in. NAG Press Ltd., 226 Latymer Court, London, W 6. Price 3s.6d.

★ ★ ★

This Trade Names Index, first published in 1954, has been thoroughly revised and now contains about 2,500 trade names. A data sheet supplement gives information on a number of subjects to users and producers of diamond tools and the physical and chemical properties of diamond, the crystallography of diamond and the care of diamond truing tools, shaped diamond tools, glaziers diamonds, are covered. Further a list of diamond tool standards as established in England and other countries is given as well as a comparison of fine sieve sizes. The Trade Names Index does not only contain registered trade names but also generally used abbreviations and names of firms which have a special standing in the trade. A classified index covering over 20 individual groups is added so that trade names which are used in any particular branch of the industries using and working hard materials, can easily be found.

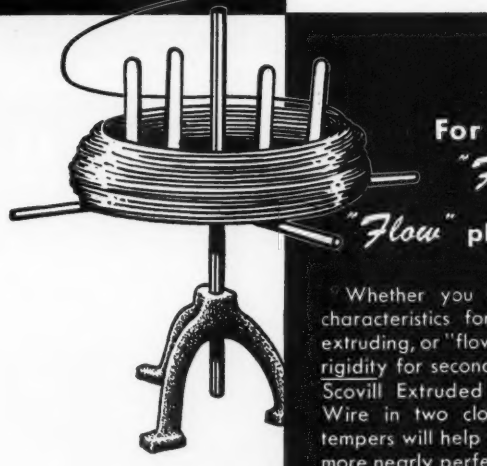
New Tote Box Developed

A superior line of nesting type tote boxes for materials handling has been announced by the **William Bal Corporation,** 2A Johnson Street, Newark 5, New Jersey. Featuring four steel lugs riveted to the tapered, vulcanized fibre sides—the lightweight tote boxes nest without jamming—an improvement over ordinary nesting types. Quicker handling of parts and materials is assured by this simple and effective improvement, according to the manufacturer.

★ ★ ★

Inquiries should be addressed direct to the manufacturer.

SCOVILL
extruded
COLD-HEADING
WIRE
(Cartridge Brass, 70%)



For "Flow" or "Flow" plus RIGIDITY

Whether you require "flow" characteristics for heading and extruding, or "flow" plus essential rigidity for secondary machining, Scovill Extruded Cold-Heading Wire in two closely controlled tempers will help you to produce more nearly perfect cold-headed brass parts.

Because of its higher copper content and production by the Hot Extrusion process from uniformly sound Continuous-Cast billets, Scovill Extruded Cold-Heading Wire virtually eliminates such defects (attributed to wire) as split heads or shanks, "out-of-round" heads, inadequate filling out of heads and shoulders, and rough "orange peel" effect. These are differences in quality you can SELL . . . Let us help you specify the proper temper for your own operations.

You Can SELL the Difference

SCOVILL MANUFACTURING COMPANY
Mill Products Division
99 MILL STREET • WATERBURY 20, CONNECTICUT
Phone Plaza 4-1171

22SC54B

WAFIOS

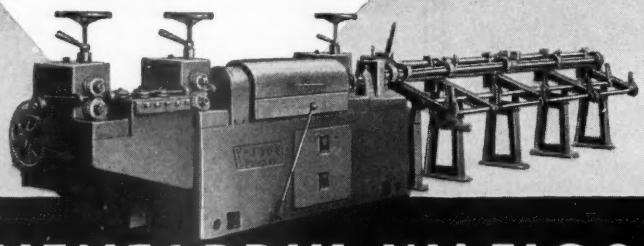
WIRE-WORKING MACHINERY

Wire Netting Machines for Chain Link, Hexagonal Mesh, Poultry Netting, Field Fence. Crimping, Barb Wire and Staple Machines. Spring Coilers. Spring End Grinding Automatics. Loop Benders. Upholstery Spring and Wire Mattress Machines. Wire Nail Machinery. Chain Formers. Chain Welders. Straightening and Cutting Machines. Multi-Slide Wire and Strip Forming Machines. Special Machinery for the making of Paper Clips, Lock Washers, Bale Ties, Key Rings, Tin Openers, Wire Bag Ties, etc. Automatics for Flexible Metallic Tubing.

Sole Agents:
Kurt Orban Company, Inc.
205 East 42nd Street
New York 17, N. Y.

WAFIOS

SINCE 1893



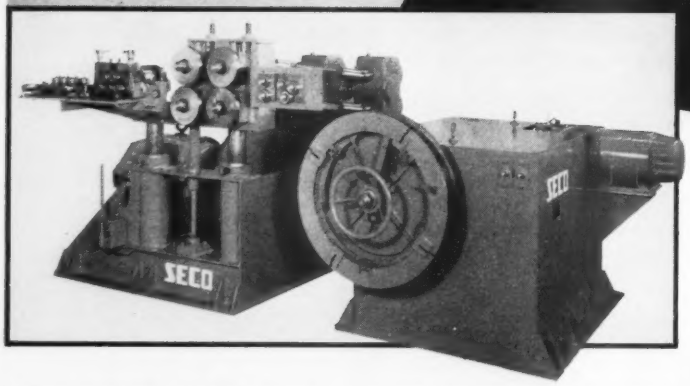
MASCHINENFABRIK WAFIOS

WAGNER, FICKER & SCHMID **REUTLINGEN 3 / WÜRTT. GERMANY**

Outstanding Features Superior Performance

NEW Heavy Duty COILER for Electrode Wire

DOES ALL THESE OPERATIONS



1 - STRAIGHTENS 2 - MEASURES
3 - FEEDS 4 - PRECASTS 5 - COILS

This Coiler handles welding wire of 3/32" to 3/8" diameter at 200 to 800 F.P.M. on blocks of 12" to 25" diameter.

Mechanically it consists of two separate units: the first doing the straightening, measuring, feeding and pre-casting of the wire, the second doing the coiling only.

Electrically both units are tied together in as much as all motors are controlled from one VS drive and control unit.

- Puts a predetermined cast in the wire prior to its coiling on the block.
- Makes a traverse wound coil which will easily uncoil although being close and tightly wound with no danger of springing open.
- First unit equipped for hydraulically raising or lowering the entire roll assembly for proper lineup with the block diameter.
- Complete control over traverse mechanism for delaying reversal at stroke ends.
- Compact construction with easy accessibility to all moving parts.

Write for full information and data—or consult our engineers on your coiling problems—no obligation.

STEEL EQUIPMENT CO. 20805 AURORA ROAD CLEVELAND 22, OHIO

SECO

Bulletin Describes New Heat Exchanger

A bulletin describing a new line of heat exchangers has been issued by **Nukem Products Corp.**, Buffalo 20, N. Y.

★ ★ ★

They are called the "Nukem Hi-Temp Heat Exchangers" and are designed for use in place of other methods of heat transfer of corrosive liquids. They have been field tested, users reporting as high as 15% savings in their acid consumption in pickling, plating and chemical solutions.

★ ★ ★

These heat exchangers will maintain uniform solution temperatures throughout a tank, with no hot spots or cold zones, without dilution, as in the case of steam jets. They can replace steam jets or steam coils for efficient and economical heat transfer in acid, salt or alkaline solutions within a temperature range of 35° to 200°F.

★ ★ ★

Copies of the bulletin, giving capacity ratings of different models and other data, will be sent upon request to the company.

Bulletin on Ductile Cast Iron

Bulletin DI-1, 12 pages with illustrations, graphs and charts, describes a recently developed family of irons which possesses the process advantages of cast iron and which has engineering properties that approach those of cast steel. Strengths up to 120,000 psi, substantial ductility and resistance to heat and wear are reported. Potential applications in numerous fields are indicated.

★ ★ ★

For a copy, write to International Nickel Co., Inc., New York 5, N. Y.

Bulletin on Uses of Stainless Steel Wire

A bulletin has been issued by **Fort Wayne Metals, Inc.**, 3211 MacArthur Drive, Fort Wayne, Ind., manufacturers of precision stainless steel wire, illustrating and describing some of the uses of this wire.

★ ★ ★

Among the applications covered are stainless steel wire for filters, instruments springs, marine and aircraft cables, braided shields, flexible tubing, shock absorbers, catalysts, scouring pads, thread inserts, brush wire, magnetic recording wire and abrasive wire for making precision grooves.

★ ★ ★

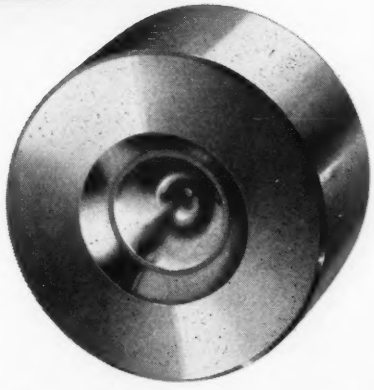
Copies of this booklet, "What You Can Do With Stainless Steel Wire," may be secured by writing the company.

Editorial Correction

On page 646 of our June issue the name of Samuel C. Avallone, Metallurgist; American Steel and Wire Division, United States Steel Corp., Worcester, Mass., was incorrectly given as "Samuel C. Avalon, Phalo Plastics Corp." We regret the error and trust that it caused him no inconvenience. He served as a member of the Program Committee for the Worcester Regional Meeting of the Wire Association on June 22nd and 23rd, having charge of the plant visit to American Steel and Wire's Electrical Cable Works.

WILLEY'S
TUNGSTEN CARBIDE

METALS
DIES
TOOLS
for the Wire Industry



Rough Cored Standard Dies
(from stock)
ROUND SQUARE HEXAGON OCTAGON

Rough Cored or Finish Ground
(Immediate quotations on receipt of your prints—
Fast delivery schedules)

SPECIAL DIES WEAR PARTS MANDRILS
NIBS—HEADING AND EXTRUSION DIES

For complete information:

Willey's Carbide Tool Co.
1340 W. VERNOR HWY. • DETROIT 1, MICHIGAN

THE BEST FOR COVERING...

The **POURTIER** *High-Speed*
INDIVIDUAL INSULATING MACHINES

INDIVIDUAL HEAD, handling wire sizes of 7 to 32 A.W.G. Other models made with up to four (4) serving bowls.

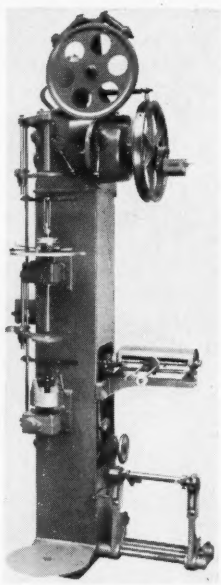
POURTIER MACHINES will serve cotton, paper, cambric, fiberglas, silk, nylon and cellulose acetate at speeds of 4500 r.p.m.

EQUIPPED WITH:

9 speed gear box for the haul-off capstan, automatic central lubrication and slow starting mechanism. Speeds easily changed. Bowls with compensator controlling the unrolling of the bobbin and a quick stopping device, in case of breakage of insulating material. Special control to change the direction of the motion of the heads. Traverse motion's speed and displacement easy to set up.

Machines are built to meet AMERICAN STANDARDS

SHORT DELIVERIES — LOW PRICES



INSULATING MACHINE IM 402

POURTIER MACHINES

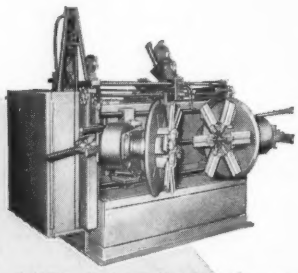
153 RUE GALLIENI, ROMAINVILLE-SEINE, FRANCE

For the U. S. exclusively for I. M. Machines, address inquiries to FIDELITY MACHINE CO., Inc. Philadelphia, Pa.

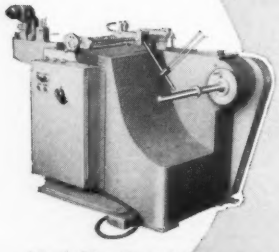
For other machinery, send inquiries to POURTIER MACHINES. See address at left.

FOR FASTER MORE EFFICIENT WIRE PRODUCTION .....

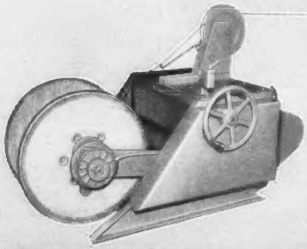
WIM EQUIPMENT



Fully Automatic Continuous Coiler and Respooler



Variable Speed, Constant Footage Respooler



Adjustable Tension Payoff Stand

Designed for more efficient wire production, WIM equipment is engineered to save you time, money and effort. Smooth high speed performance is assured. Continuous dependable operation is featured. The result is a line of wire handling machines that will handle your toughest jobs with little or no servicing. Write today for further information. Our engineering staff will be glad to help work out your problems.

WIRE INSULATING MACHINERY, INC.

Division of Machinery Electrification, Inc.

Northboro Mass., U.S.A.

Wire Rope Catalog

John A. Roebling's Sons Corporation has issued a new publication entitled "Wire Rope Recommendations and Catalog," designed to provide a simplified ordering plan and reference for wire rope users.

★ ★ ★

The catalog is divided into 16 sections, one for each of the major industries using wire rope. Each section gives detailed information on wire rope for specific requirements.

★ ★ ★

The new Roebling plan for ordering uses code numbers for the different sizes and types of wire rope. Orders only need the code number and length of rope required. Mention of end-uses will insure proper lubrication for given applications.

★ ★ ★

The new Roebling catalog includes photographs showing various wire rope applications in shipping, logging, construction, and mining.

Corrosion Resistant Steel Wires Announced

The Kenmore Metals Corporation of Jersey City, N. J., has perfected and patented a new method for the electroplating of steel wire. By the new method steel wire can be electroplated continuously with copper, nickel, zinc and similar metals.

★ ★ ★

Research is under way for applying the basic process to the electrocoating on aluminum. If successful, this will enlarge the use of aluminum as conductor.

★ ★ ★

The feature is that such plated wire can then be cold-drawn to desired sizes without disturbing the relationship of the two metals as originally plated.

★ ★ ★

The process, Mr. Kenmore stated, permits the processing of steel wire in compact units of approximately 30 ft. by 6 ft. wide, wherein 900 ft. of wire is continuously under plating.

★ ★ ★

The process, which is applicable and has been used in the field of stainless steel wire, is said to be new in these respects:

(1) In eliminating the use of lead in drawing stainless steel wire.
(2) In protecting the surface during heat treatment.
(3) In more than doubling the speed at which stainless steel wire can be drawn.

★ ★ ★

Citing the amount of copper that may be conserved by the process, Mr. Kenmore said that in the U. S. Corps of Engineers' application of copper-coated wire in the Mississippi River revetment project, the copper saved would amount to approximately one million pounds annually. This division has already approved the new product and has placed orders for approximately ten million feet. In the stainless steel wire field, one of the largest telephone equipment concerns has contracted for more than 100 million feet of stainless steel wire.

New Reference Book on Grinding and Cutting Wheels

An attractive bright new plastic bound reference book on grinding wheels has just been issued by

Thermoplastic
Cable Sheathing Kraft

the patented paper used in

NONMETALLIC SHEATHED CABLE

Is highly water repellent.
Available in all weights
both creped and flat.

Merrimac
Paper Co., Inc.

Mills — Lawrence, Mass.
295 Madison Ave., New York City

Also manufacturers of many tailor-made
Varnishing, Saturating, Tubewinding
and Insulating Papers

Chicago Wheel & Manufacturing Company. All types of Grinding Wheels, Flex Wheels, and the new Break Resistant Cut-Off Wheels are carefully and fully described in a most conveniently indexed form. Proper operating speeds of all types of grinding wheels are given on large easy to follow tables. One of the unique features of this new book is the wide array of accessories for use on small hand grinders claimed by the manufacturer to be the largest and most complete assortment ever gathered together. Anyone who uses grinding wheels or portable tools will find this book helpful.

★ ★ ★

For a copy, please address the company at 1101 W. Monroe St., Chicago 7, Ill.

Chart Gives Equation for Trigonometrical Shapes

Alba Engineering Co., Inc., 5705 S. Alameda St., Los Angeles 58, California, an aircraft parts and aircraft assembly manufacturer, has released a novel and useful promotional item to their trade. An innovation to the industry's advertising schemes, the item is a chart unique in its practical simplicity, that spells out the equations for any trigonometrical shape. The Chart is called Trig-Pal.

★ ★ ★

The chart is designed to be hung on a wall. It is plastic coated so it may be kept clean. The chart itself shows the equations to learn the unknown factor when other factors are known. It operates for right angle trig., oblique angle trig., compound trig. and spherical trig.

★ ★ ★

Alba management personnel anticipate an enthusiastic response from engineers, draftsmen and machinists. The trade has had many charts, but this one should serve a more useful purpose than the ordinary time-worn charts.

★ ★ ★

The Trig-Pal chart is copyrighted and manufactured by James D. Volts Associates, P. O. Box 621, Culver City, California. Alba Engineering Co. Inc., has obtained the first distribution of the new chart and will send one upon request.

Aluminum Output of Three Billion Pounds Seen by '55

Progress reports at the Aluminum Association's Summer meeting held in May at White Sulphur Springs show that except for one reduction plant under construction at Columbia Falls, Mont., the second round of current aluminum expansion is now complete.

★ ★ ★

"The last plant in the program is scheduled for commercial production early in 1955," said **Donald M. White,** secretary of the association. Authorized to meet mounting defense and civilian needs for the metal, these two rounds of expansion will about double the industry's primary capacity in a period of only four years.

★ ★ ★

When the Columbia Falls plant is complete, the industry will be

Refinishing Wire Drawing Dies?

Save Money with NORBIDE® Abrasive . . .

Second in hardness only to diamond which costs a hundred times more

Johnson Steel & Wire Co., Inc. has substantially reduced the cost of refinishing their wire drawing dies by substituting NORBIDE Abrasive for costly diamond dust. Excellent for ripping or for fast stock removal as well as for accurate semi-finishing operations.

High accuracy is important to Johnson for Johnson "music" spring wire is drawn in 200 different sizes, all the way from .003" to .200".

If you are still using diamond dust for your ripping and semi-finishing operations, you'll be amazed at the savings you can obtain by switching to NORBIDE Abrasive.

For cost-cutting abrasive details, write for Form 559.

NORTON COMPANY

45 New Bond Street • Worcester 6, Massachusetts

NORTON

BORON CARBIDE

NORBIDE® . . . the hardest man-made abrasive

capable of turning out approximately 3,000,000,000 pounds of primary aluminum annually. This compares with a total capacity of 1,457,000,000 pounds in 1950.

★ ★ ★

To supply the additional bauxite needed for the expanded aluminum production, mining operations have been increased. Two U. S. companies are now mining bauxite in Jamaica and more ore is being mined in South America. As a matter of record, imported bauxite represented 73% of the total U. S. supply in 1953. Of this imported ore, 71% came from Surinam, South America, 27% from Jamaica and about 2% from British Guiana.

★ ★ ★

Other aluminum fabricating plants also were included in the expansion program, to supply the metal in the forms needed for the increased defense and civilian uses. These have been widely distributed throughout the country.

Develops Process to Straighten Nylon-Jacketed Wire Leads

A new process to straighten nylon-jacketed wire leads has been developed by the **Manger Electric Co.**, of Stamford, Conn., an accomplishment which promises to end many heretofore unavoidable assembly line snags.

★ ★ ★

Required on many government and industrial wiring hookups, nylon-insulated leads contain physical properties which make them coil and twist into shapes defying easy handling. After treatment by the Manger process the wire leads will hold their straightness until used. No chemicals are used, simply heat and cold, and the wire retains its flexibility, but all the many problems of handling nylon-jacketed wire leads are eliminated.

★ ★ ★

In supplying the wire leads, Manger Electric counter-strips the nylon jacket, thereby giving greater pliability to the butt end of the insulation and preventing the possibility of wire strands shearing off. All terminal ends are supplied with a minimum of solder, so that insertion into the solder openings can be made without delay and waste.

★ ★ ★

Inquiries may be directed to the Manger Electric Co., at 25 Miller Street, Stamford, Conn. The company specializes in stripping, solder dipping, coding and terminating conductors.

Bulletin on H-D Air Compressors

Joy Manufacturing Company, Henry W. Oliver Bldg., Pittsburgh, Pa., announces the release of a new 36-page Bulletin A-72 on Joy Series 100, Class WN-114 heavy-duty air compressors for industry. The bulletin contains complete information on construction and operation of the compressor. Illustrated are seven models of the compressor as a single unit for displacement capacities from 1186 to 1948 CFM as well as twin units which furnish up to 3896 CFM.

★ ★ ★

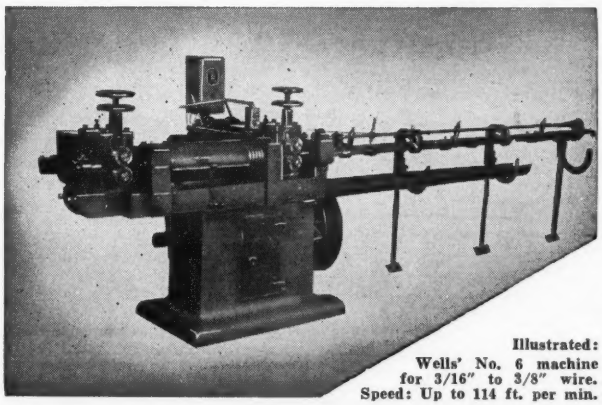
The Joy WN-114 is a two-stage, double acting compressor of four-cylinder semi-radial design. It is available with flange-mounted, V-belt, or direct connected drive. Features include honed, replaceable crosshead and cylinder liners, patented "Dual Cushion" valves, and full force-feed lubrication.

★ ★ ★

What do you want in your

STRAIGHTENER and CUTTER?

- **DEPENDABILITY?** **WELLS machines provide day-in, day-out continuous operating service.**
- **SPEED?** **These automatic rotary machines will not only give you speed, but accuracy as well.**



Illustrated: Wells' No. 6 machine for 3/16" to 3/8" wire. Speed: Up to 114 ft. per min.

Cuts wire in any length from 7½" up to 25'. Special attachment furnished on order for long lengths. Straightener flier runs in ball bearings. Gear drive and motor enclosed in base. Door provides accessibility.

58 years of experience and continuous engineering, with use of finest materials, have put WELLS machines in a class by themselves for excellence of performance. Built to handle the toughest jobs, year after year, with little or no servicing. Supplied in a complete range of sizes.

Send for Catalog covering the full line.

Frank L. Wells Company

KENOSHA • 5821 Fifth Avenue • WISCONSIN

Builders of Fine Wire Working Machinery

New Acid and Plating Hose Announced

A new line of hose designed to handle hot acids and all plating solutions is now available for shipment out of stock in sizes of 1", 1½", 2" and 2½" ID. Larger sizes can be provided if needed on reasonable delivery schedules.

★ ★ ★

This hose is designated as Camac Acid and Plating Hose and is constructed of Butyl rubber with 4 ply reinforcing. Tests have proven the ability of this hose to stand up under all hot acids except nitric or chromic. Further tests show that the hose does not contaminate plating solutions.

★ ★ ★

Suitable fittings and stainless steel hose clamps for this hose are also in stock for immediate shipment.

★ ★ ★

Descriptive data sheets and prices are available on request from: **Carl Buck and Associates,** Essex Fells, N. J.

Appoints Fidelity as U. S. Distributor for Wire Covering Machines

Fidelity Machine Co., Inc., 3908 Frankford Ave., Philadelphia 24, Pa., industrial machine manufacturer, has been appointed exclusive American distributor for insulating — taping machines by a European manufacturer, **Pourtier Pere et Fils,** Romaineville-Seine, France.

★ ★ ★

R. D. Faigenbaum, vice-president of the Philadelphia firm, who made this announcement, said the machines will be warehoused and serviced by Fidelity. They may be seen in operation in Fidelity's show room and will be sold F.O.B. Philadelphia.

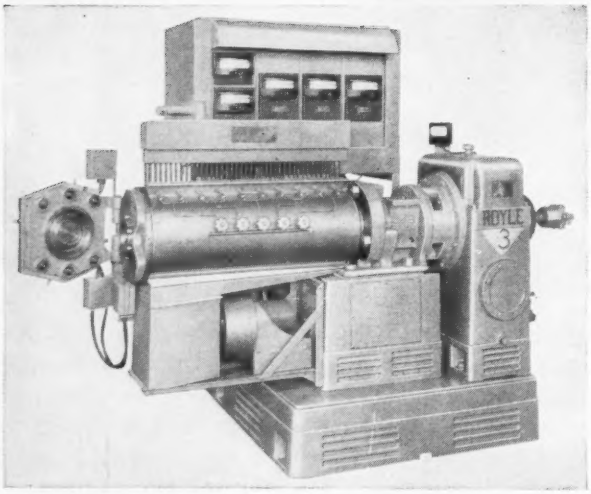
★ ★ ★

This marks the first time in its history that the 33-year-old company has sold and serviced equipment for another manufacturer. Pourtier Pere et Fils considered many American companies for the sole distributorship. Fidelity was selected because of its knowledge and experience in the wire industry, and long-standing reputation as a precision machine manufacturer. The Sinfra wire covering machine and the Haul-Off machine, developed by Fidelity, are used by leading wire and cable manufacturers throughout the world. These machines will complement the French line.

★ ★ ★

The French insulating-taping machines are used for covering fine wire with cotton, paper, fiberglas, silk, nylon, cellulose acetate or other fabrics. Features of the machine include an 8-speed gearbox driving the haul-off capstan; high-speed serving and taping heads driven by change gears. A head with a special compensator assures constant unrolling of the bobbin. In case of breakage, the machine stops automatically.

FASTEST HEATING FASTEST COOLING



Here are some of the time-tested, money-saving reasons more and more plants are standardizing with Royle Spirod* Extruders for processes requiring maximum flexibility in controlled temperatures — constantly maintained and accurately zoned:

- **Extra heavy walled cast steel cylinders that will not warp. No joints to leak when pressures are high or crevices to collect burned compound that would cause contamination.**
- **Heavy duty large diameter heating elements, that can be used with 440 volts without step-down transformers, provide radiant heat to cylinders and heads.**
- **Any heating element may be removed and replaced without disturbing other elements or wiring.**
- **A cooling system with ten times the capacity of conventional designs can be modulated through its entire temperature range without drastic changes. Ample cooling for all compounds at maximum speeds.**

No. 3 Royle Spirod Extruder. Completely insulated and equipped for evaporative cooling.

*Patent Applied For

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

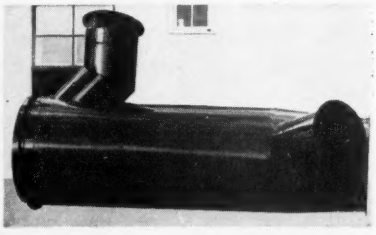
PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

London, England — James Day (Machinery) Ltd. — REgent 2430
Home Office — V. M. Hovey J. W. VanRiper — SHerwood 2-8262
Akron, Ohio — J. C. Clinefelter — SWandale 4-5020
Los Angeles, Cal. — H. M. Royal, Inc. — LOgan 3261

PATERSON 3, NEW JERSEY

Plastic Protective Coatings for Large Metal Structures

Large machinery, metal structures and industrial equipment can have the same corrosion-stopping and other benefits by which, for several years, "Plastisol" Coatings and Linings have slashed physical depreciation and maintenance costs of small units. Development of necessary techniques and building of greatly expanded facilities by a pioneer and leader in the field of Plastisol coatings has made this possible. One of the nation's leading electrical manufacturers is utilizing these facilities to have massive hoods, ducts and transition pieces coated for protection against corrosive fumes.



Plastic Covered Metal Duct.

★ ★ ★

Plastisols are "solutions" of polyvinyl chloride. Developed during World War II, the broad scope of their practical uses is just becoming evident, with new and improved applications constantly appearing. Ability to form impenetrable barriers to chemical and electrolytic action are but two of their outstanding characteristics.

★ ★ ★

Small metal parts may similarly be protected against corrosion or abrasion to advantage, such as conveyor links, dipping baskets, small ducts, salt water strainers, etc.

These protective coatings are supplied by the Arbonite Corporation, 900 N. Main St., Doylestown, Pa., who will be glad to furnish further information upon request.

New Catalog on Cleaning Nozzles

A new catalog describing its line of airblast cleaning nozzles has been published by **American Wheelabrator & Equipment Corp.**, 1184 South Byrkit St., Mishawaka, Indiana. Three standard models of nozzles are described. Also included are pressure blast hose fittings for standard airblast nozzles.

★ ★ ★

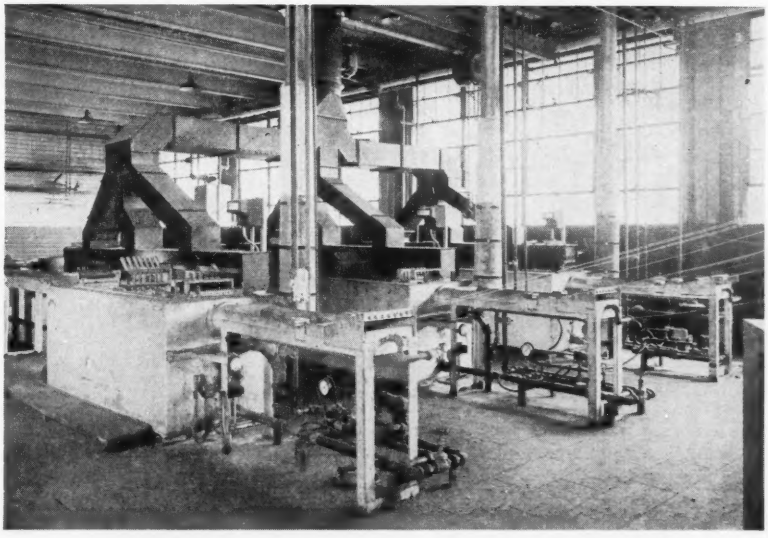
Of special interest to cleaning engineers is the description of materials employed in the nozzles, and the discussion of how to control compressed air consumption. This is accompanied by tabular data showing the importance of controlling nozzle wear.

★ ★ ★

Free copies of this catalog, No. 27-A, may be obtained by writing the company.

Gas Atmospheres Announces Appointments

William Boyd, General Sales Manager of **Gas Atmospheres, Inc.,** Cleveland, Ohio, has announced the appointment of **William Barstow** as assistant sales manager and **William Marquardt** as assistant chief engineer. **John Vance** has been named sales engineer for the eastern district comprising New York City, New Jersey, Eastern Pennsylvania, Delaware, Maryland and Washington, D. C.



for Tinning Fine Copper Wire

These Rockwell high speed, automatically controlled furnaces handle multiple strands of fine wire in a continuous fluxing, wiping, tin coating, quench and rewinding process at a production rate of 8800 lbs. per hour.

Similar Rockwell wire processing equipment has been designed for application of other metal coatings, galvanizing and for lead annealing.

It will pay you to investigate Rockwell's experience in the heat treatment of ferrous and non-ferrous wire and strip.

ROCKWELL ALSO BUILDS

- Complete processing equipment for enameling, tinning, glass coating or synthetic coating magnet wire.
- Batch or conveyor type ovens, electric, fuel or steam heated, for aging, annealing, drying or baking insulated magnet wire.
- Batch or continuous, electric and fuel-fired furnaces, direct heated, muffle or radiant tube type for annealing, bright annealing, hardening and drawing.
- Gas generators to provide protective atmospheres for bright annealing.

ROCKWELL SINCE 1888 BUILT

W. S. ROCKWELL COMPANY

FURNACES • OVENS • BURNERS • VALVES • SPECIAL MACHINERY

2424 ELIOT STREET • FAIRFIELD, CONN.

Sales Representatives in Principal Cities

Electrical Features of Alcoa's Lancaster Works

The electrical system at the new fastener works of **Aluminum Company of America** at Lancaster, Pa., was designed to take advantage of cost savings available in using aluminum structures and aluminum conductors. Several other features were selected on the basis of maximum economy for the specific operations involved.

★ ★ ★

The electrical load here consists of a total of 2847 H.P. in the form of motors, 360 KW for resistance furnaces, and 375 KW for lighting.

★ ★ ★

Power at 66 KV is taken from the utility's line and stepped directly to 480 volts with three-phase, 1200 KVA transformers located in an outside substation, which is of all-aluminum construction, and was partially shop fabricated.

★ ★ ★

Aluminum was chosen for the substation structure to minimize corrosion and maintenance expenditures. Partial assemblies of latticed columns and trusses were received from the factory and bolted into place at the plant site. In addition to the savings that factory-assembled sections permitted over total field construction, the light-weight aluminum provided lower handling and transportation costs.

★ ★ ★

Conductor inside the substation is 1/0 all-aluminum cable. Connections from the transformer secondary terminals to the indoor switchgear were made with insulated 1000-MCM Type RH/RW aluminum cable.

★ ★ ★

Power is distributed through the plant over a closed loop, which was chosen as the most economic system for the loads involved. Two cables per phase, 1000-MCM aluminum with Type RH/RW 600-volt insulation and neoprene cover, comprise the closed loop. The six cables (arranged ABC, ABC) are installed horizontally on open insulating cleats. This type of installation resulted in a saving of 50% over the cost of equivalent current-carrying capacity installed in conduit.

★ ★ ★

From the loop, single or double taps are made through breakers to sub feeders. Lighting loads are centrally switched. Some of the more concentrated machine load areas are fed from aluminum plug-in bus duct, which provides for maximum flexibility of operation in those areas.

★ ★ ★

The lighting was planned for 50 footcandles at all work areas. Auxiliary and service areas were designed for 35 footcandle intensity, while lighting of docks was designed for 10 footcandles. Two- and three-lamp Alzak* reflector luminaires with four- or six-foot fluorescent lamps were installed in

* Registered Trademark

(ILLUSTRATED)
42" x 20" x 21"—(4000# cap.)

HEAVY DUTY
BREAK-DOWN REELS

1000#
2000#
4000#
} capacities

Rugged Design including patented DURA-CURL rim, and many other features necessary to provide the *Strength* and *Durability* needed for continued successful performance.

Also complete line of sizes of Modern High Speed Wire Drawing NO-CREV Spools and Reels for both fine and intermediate size wire.

Telephone
Attleboro 1-0848

Mossberg PRESSED STEEL Corporation

18 WEST ST., ATTLEBORO, MASS., U.S.A.

James Day (Machy) Ltd.
28 Maddox St.
London W.1. England

#103

the various areas, depending on the lighting requirements. In many of the plant areas the Alzak reflector units were installed on messenger cable.

★ ★ ★

The street and yard lighting system includes twenty-four 400-watt mercury vapor lamps mounted on twenty-six foot aluminum standards by six-foot arms. On each of the six standards adjacent to the parking lot, two 300-watt Alzak floodlights are mounted to provide special illumination.

New Self Centering Wire Stripper Cuts Clean and Close

A triple-disc cutting mechanism that automatically centers the wire it strips of insulation and provides its own extra cutting edges is the feature of the **High Speed** Wire Stripper manufactured by **High Speed Hammer Co., Inc.** of Rochester, N. Y.

★ ★ ★

Insulation is removed by three hardened steel discs, that are angled into cutting position slightly overlapping each other. Preadjusted to cut thru the insulation, the slight pressure on the core of the wire at the intersection of the three arcs centers the work for extreme accuracy.

★ ★ ★

A new set of cutting edges is merely a matter of loosening and turning each of the three discs slightly.

★ ★ ★

The High Speed Stripper, a ¼ H.P. bench model designed for production line stripping, removes all types of insulation including plastic types from solid, stranded or multi-conductor wire. Provision has been made for simple adjustments for diameters up to ½" and for strips to 1½" in length. Performances of 3000 strips per hour have been reported.

★ ★ ★

The High Speed Stripper sells for $132.50 F.O.B. Rochester. Send for circular to The High Speed Hammer Co., 313 Norton St., Rochester 21, N. Y.

New Data Booklet on Material Handling Equipment

Cleveland Tramrail's "Engineering and Application Data" Booklet has been revised and latest information covering overhead materials handling equipment has been included. Subject material takes in various track drives, cranes, electrification, buckets, grabs, etc.

★ ★ ★

The Booklet will be sent free by writing to **Cleveland Tramrail Division, The Cleveland Crane & Engineering Co.,** Wickliffe, Ohio, and asking for Booklet No. 2008-K.

Now Making Oil Burner Blower Wheels

The Torrington Manufacturing Co., leading producer of air impellers for the heating, cooling and

International Wire Products Corp.

Midland Park, N. J.

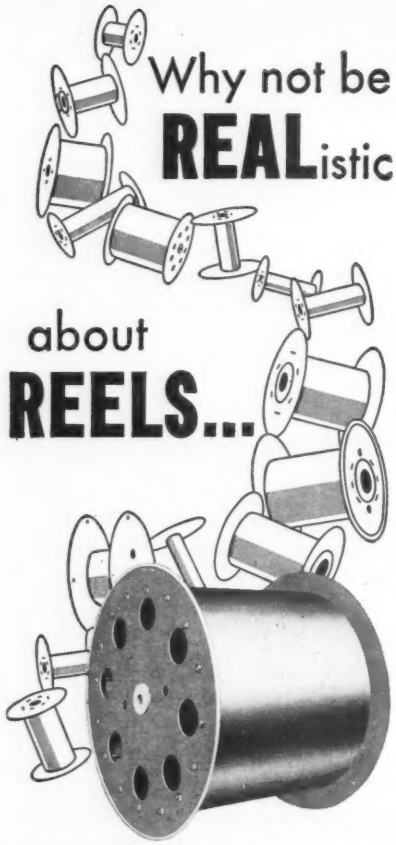
Fabricators of copper, stainless, monel, and steel strands and cables in the fine sizes.

We invite special constructions for experimental cables and strands —for use in Engineering Department work.

We specialize in strands and wire for the costume jewelry trades— Gold colors and silver color strands and wires.

Our facilities include wire drawing, tinning and stranding of single end and multiple wires.

Strand annealing furnace for monel, stainless and silver plate wires —including phosphor bronze and brass from .040 to .002 fine sizes.



Why not be **REAL**istic about **REELS...**

It stands to reason that a company that's been doing a specialty job for more than 50 years really has the hang of it.

Apco Mossberg Company, for over a half century, has been everlastingly at the job of providing manufacturers of copper wire, steel wire and wire rope with all types and sizes of high quality steel reels, spools and bobbins.

Apco trained engineers consider each and every inquiry regarding steel spools, reels or bobbins separately . . . give individual attention to the design and construction to make certain that customers' requirements are carried out to the letter.

Reels are available in all sizes and shapes . . . for all applications. Write for further details today.

PACIFIC COAST REPRESENTATIVE
Gordon Proffitt
Matson Building
215 Market St.,
San Francisco, Calif.

CANADIAN REPRESENTATIVE
Hugh P. Williams & Co.
47 Colborne Street, West
Toronto, Ontario, Canada

The original Frank Mossberg Company

APCO MOSSBERG COMPANY
ATTLEBORO, MASS.

ventilating industries, has announced development of two new sizes of blower wheels "especially designed for oil burner application."

★ ★ ★

Dudley B. Robinson, Torrington vice president, said the new blower wheels are being produced in 5⅛ and 5¾-inch diameters. He explained that the two new sizes add flexibility of choice in meeting accurate design requirements for uniformly balanced air impellers among members of the heating, ventilating and cooling industries.

★ ★ ★

The additional sizes have been found necessary because of requirements to obtain additional air within the physical size limitations of existing equipment.

★ ★ ★

Mr. Robinson said that Torrington's recent plant expansion program and its modern production facilities in Torrington as well as at subsidiary plants in Van Nuys, Calif., and at Oakville, Ont., permit fast and flexible scheduling of deliveries.

Bulletin Describes Industrial Waste Treatment

Advantages inherent in the treatment of industrial waste waters and process liquors are described in Bulletin WC-116, Industrial Waste Treatment, just published by the **Graver Water Conditioning Co.,** New York. Schematic drawings, pictures, and a problem-solution-result type of explanation demonstrate how Graver equipment solves such problems as process and cooling water shortages, contamination of streams with plant effluents, and the loss of valuable heat and materials in discarded waters and process liquors. Particular attention is given to the petroleum, metal plating and paper industries.

★ ★ ★

A free copy of this bulletin may be obtained by writing Graver Water Conditioning Co., 216 W. 14th Street, New York 11, New York.

7 out of 9

WIRE MILLS

that Liquor Finish Wire

use M&T **STANNOUS SULFATE** *because*

Tin Losses Are Reduced . . .
by elimination of high tin sludging due to incomplete reaction in feather tin method.

Results Easier to Control . . .
only two variables to watch — Stannous Sulphate and Copper Sulphate — allows immediate, simple color adjustment.

Every Batch the Same . . .
M&T Stannous Sulphate method produces smooth, uniform wire coatings, unvarying from lot to lot.

See how use of M&T Stannous Sulphate can help you save tin in liquor finishing. Write for engineering data.

METAL & THERMIT CORPORATION
Chemical Division
100 E. 42nd St., New York 17, N. Y.
Specialists in Tin and Tin Chemicals

Book on Detergent Evaluation

"Detergency Evaluation and Testing," a technical book by **J. C. Harris,** director of application research for the Merchandising Division of **Monsanto Chemical Company,** has been released by **Interscience Publishers, Inc.,** of New York.

★ ★ ★

Mr. Harris, who received a B.S. and M.S. degree in chemistry at Washington State College, utilized 23 years experience and development in the field of detergents in writing the book. It outlines and describes in full screening tests, cotton washing, wash test methods, wool washing, washing procedures for other fibers, hand surface cleaning, radioisotopic tracer methods and miscellaneous tests. The author has used the testing methods described in the book on Monsanto's suds-controlled detergent.

New Net Pricing Program Announced by Norton

Breaking a tradition of long standing in the Abrasive Industry, **Norton Company** has just instituted net pricing to make it easier to buy and sell Norton grinding wheels.

★ ★ ★

Announced April 28 by **Donald L. Price,** sales manager, Abrasive Division, in a letter to all Norton distributors, this new "net unit price program" means that a distributor or customer can determine the cost of a grinding wheel, segment, brick, stick or mounted point without resorting to former time-consuming procedures of applying multipliers to tabulated "list" prices to calculate "net" prices.

★ ★ ★

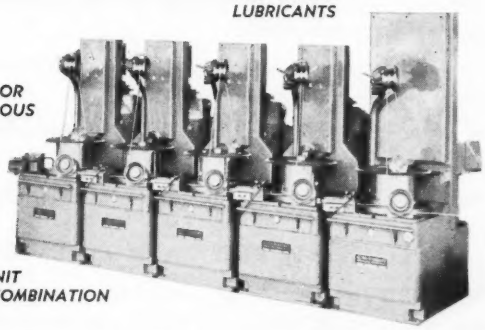
Considered the simplest pricing system in the Abrasive Industry, net prices for over 25,000 stock items ranging from tiny mounted points to huge crankshaft wheels can now be quoted quickly and conveniently for any listed size, shape, grain or grade of grinding wheel in any quantity.

★ ★ ★

AETNA-STANDARD
WIRE DRAWING UNIT

WET OR DRY LUBRICANTS

FERROUS OR NON-FERROUS

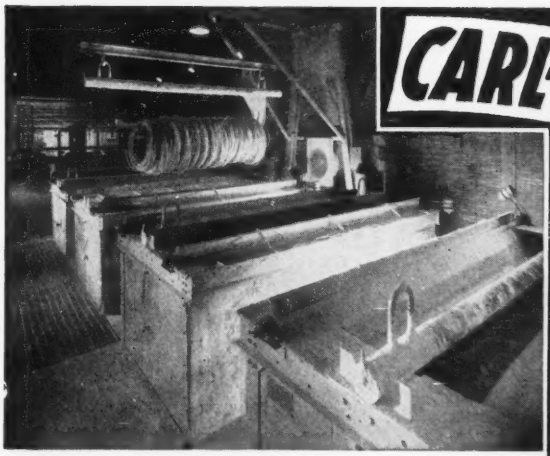


SINGLE UNIT OR ANY COMBINATION

- DESIGNED FOR COMPLETE VERSATILITY
- BUILT FOR SAFE, EFFICIENT PRODUCTION
- SINGLE OR MULTI-DRAFT OPERATION
- INTERCHANGEABLE UNITS AND PARTS
- AUTO-RHEOSTATIC SYNCHRONIZATION
- WATER COOLED BLOCKS AND DIES

THE AETNA-STANDARD ENGINEERING CO.
PITTSBURGH, PA.

ASSOCIATED COMPANIES: HEAD, WRIGHTSON & COMPANY, LTD., THORNABY-ON-TEES, ENGLAND
AETNA-STANDARD ENGINEERING COMPANY, LTD. . . . TORONTO, ONTARIO, CANADA



CARL-MAYER
HI-SPEED REGISTERED
ROD BAKERS

PATENT Nos.
U.S.A. 2,296,361 2,323,528
CANADA 2,235,559 396,144 401,589

ALSO OTHER TYPES OF INDUSTRIAL OVENS AND FURNACES

GREATER SPEED AND FUEL ECONOMY PROVES OUTSTANDING ENGINEERING

Carl-Mayer Hi-Speed Rod Bakers have an exclusive heating arrangement, combining faster baking with amazing fuel economy—and a patented Blow-Off feature which removes moisture without bumping or agitating the coils. *WRITE FOR BULLETIN NO. 350*

SERVING CONCERNS LIKE THESE:

American Steel & Wire Co.
Atlantic Wire Co.
Atlas Steel Co.
Atlas Tack Corp.
Babcock & Wilcox
Canadian Steel Corporation.
California Wire Cloth Corp.
Colorado Fuel & Iron Corp.
Crucible Steel Co. of America
Eaton Manufacturing Co.
Frost Steel & Wire Co., Ltd.
B. Greening Wire Co., Ltd.
Gary Screw & Bolt Division of Pittsburgh Screw & Bolt Corp.
Hollup Corp.
Indiana Steel & Wire Co.
Johnson & Nephew, Ltd.
Jones & Laughlin Steel Corp.
Page Steel & Wire Co.
Pittsburgh Tool Steel Wire Co.
Republic Steel Corp.
Steel Co. of Canada

THE CARL-MAYER CORPORATION
3030 EUCLID AVENUE
CLEVELAND, OHIO

First Quality

DIAMOND POWDER

We Believe That . . .

- The finest, properly graded Diamond Powders are more economical to use than paste compounds.
- For very little more in price, you get considerably greater value for your money—in Danforth powders.
- Purity of diamond powders is essential to properly finished diamond dies. Beware of bargain prices!
- Danforth grading is accurate—you get what you order.

COMPLETE RECLAIMING SERVICE

The DANFORTH PROCESS of reclaiming produces powders that are *guaranteed* to be 99% or better pure. Some reclaiming work runs as low as 80%—but never DANFORTH'S.

Write today for information on new & reclaimed powders.

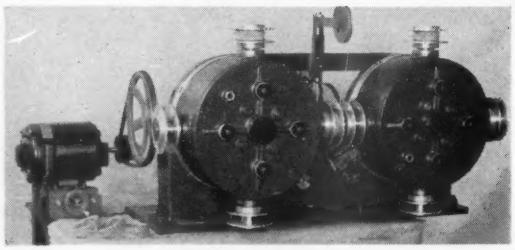
C. W. DANFORTH COMPANY

Established in 1912

P.O. Box 448 **Youngstown, Ohio**

BOYD CONTINUOUS COIL WINDER #3130

Semi-Automatic



Winds short coils (25′ to 200′) continuously. Traverse wire with layer wind. When proper length is wound, guide is forced by solenoid action to opposing spindle turning at same speed. When sufficient turns are wound on second spindle—a knife jumps between heads and cuts wire connecting the two coils. The head with the full coil indexes upward and an empty coil comes into winding position. Operator then easily removes full coil and ties it as desired. Works particularly well with bell and stove pipe wire. Can be speeded for long coils—slowed for shorter. 1/2H.P. motor provides ample power. Operator requires no training, skill or experience.

BOYD & SONS MANUFACTURING CORP. 1434-38 Callowhill St. Philadelphia 30, Pa.

FOA Mission in Formosa Wants Catalogs

The FOA Mutual Security Mission to China (Formosa) is desirous of obtaining for the mission library up-to-date catalogs of U.S. suppliers. The catalogs are needed by the technical personnel of the mission, the Military Assistance Advisory Group, and the J. G. White Engineering Company to develop specifications. Catalogs covering the following commodity groupings are required:

Raw Materials and Semi-Finished Products
Machinery and Vehicles
Construction Equipment
Medical Supplies

★ ★ ★

The mission has specifically requested that the catalogs forwarded include specifications, drawings, price lists, etc. They should be addressed as follows:

Honorable J. L. Brent
Director, FOA Mutual Security Mission to China (Formosa)
American Embassy
APO #63, c/o Postmaster
San Francisco, California

New Grinding Wheel Catalog

A new 28-page catalog describing its reinforced resinoid line of grinding wheels has recently been issued by **Norton Company.**

★ ★ ★

This liberally illustrated booklet contains typical application photographs, tables of wheel sizes, prices, operating speeds and other data. Scores of portable grinding operations are listed together with the recommended wheel specification.

★ ★ ★

The new "BN — BD — BFR — BF Reinforced Resinoid Products," catalog 1748 may be obtained by writing Norton Company, Worcester 6, Mass.

THE WIRE ASSOCIATION

invites wire men to join the organization and participate in its activities.

Write for a booklet on what it is and how it functions to

RICHARD E. BROWN

Executive Secretary

453 Main Street Stamford, Conn.

Opens Industrial X-Ray Office in Chicago

The Research & Control Instruments Division, **North American Philips Company, Inc.**, 750 South Fulton Avenue, Mount Vernon, N. Y., has announced the opening of a new regional office at 4959 West Diversey Avenue, Chicago 39, Illinois.

★ ★ ★

John C. Washburn is manager of the new headquarters which serves an area that includes Illinois, Iowa and Missouri and portions of Indiana, Kansas and Nebraska. **Robert L. Smick** will assist in handling customers needs.

★ ★ ★

Equipment displayed and demonstrated in the new Chicago office includes the complete line of Norelco X-ray Diffraction and Spectrographic Instruments and Accessories; also Industrial Radiographic Units. Spare parts and service are also available.

New Wire Packaging Method Adopted

An entirely new concept of wire packaging has been adopted by **Hatfield Wire & Cable, Division of Continental Copper & Steel Industries, Inc.** Called the "New Look" by Hatfield, this new packaging method will make the handling, stocking, and selling of wire faster, easier and more economical.

★ ★ ★

By the use of color-keying, every different type of Hatfield wire is quickly identified, located faster! Every type of wire has been assigned a color for its label and wrapping. This system makes it easy to put building wire into stock. Color coding, separation according to type and size, starts right at the loading platform, with this system.

New Folder on Electron Microscopes

A new 4-page folder titled "Some Reasons Why The EM-75 and EM-100 Electron Microscopes Deserve Your Consideration" is available gratis from the Research & Control Instruments Division,

VINYLS for...

CRITICAL CUSTOMERS

For the past ten years we have specialized in the compounding of Vinyl extrusion and injection molding compounds to specifications, or developing compounds for a specific use.

Underwriters' approved standard compounds are available in all colors for POT, T, TW, 80 Degree C, 90 Degree C and 105 Degree C wires.

If you require a Vinyl compound rated higher than 105 degrees C for special applications, we suggest you communicate with us, as we may have a compound to meet your requirements.

Your inquiries are invited.

ELECTRONIC RUBBER COMPANY

69 Sunnyside Ave. • Stamford, Conn.

If you answer YES to these two questions -

1. Do you form Wire, Strip, Bar, Angles, Channel or Tubing?
2. Are short production runs a bottleneck in your plant?

Your best bet is the NEW CURVETTE

Here is a simple, ruggedly built machine for precision bending – particularly economical in set-up time for short production runs. Completely new, but soundly engineered by the makers of the outstanding Bendit, Bendit Jr., and Curvit. The CURVETTE is a tool every shop can afford. Bends ¼" basic wire into almost any shape you desire. Takes strip up to ¾" by ⅛". Write for full details.

LUND PRODUCTS DIVISION

PRECISION MACHINES FOR THE METAL WORKING INDUSTRY

BENDIT, CURVETTE
CURVIT, BENDIT JR.

of Artys Sales Company

11 Broadway New York 4, N. Y. TEL: WHITEHALL 4-5480

speed up your production with

SHEFFIELD

manufacturers wire

Sheffield Manufacturers Wire is drawn from steel made from furnace to finished product in Sheffield's own mills. Quality is checked and guarded at every step. Perfect uniformity and accuracy of gauge are assured, for greatest efficiency in your operation.

Sheffield is prepared to serve your needs quickly for manufacturers wire in any quantity. Get in touch with your nearest Sheffield office.

KANSAS CITY, MO. • TULSA, OKLA. SHEFFIELD STEEL CORPORATION HOUSTON, TEX.

KAY & WARREN CO.

33 BOX ST., BROOKLYN 22, N. Y.

Telephones: EVergreen 3-5514 & 3-5560

RECLAIMERS

of

INDUSTRIAL DIAMOND POWDERS

FROM USED WHEELS • HONES • SLUDGES

• COTTON WIPINGS • WIRE DIE POWDERS

ALL POWDERS CLEANED, ASSAYED AND GRADED TO MICRON SIZES.

Write or call for additional information

North American Philips Company, Inc., 750 South Fulton Avenue, Mount Vernon, N. Y.

★ ★ ★

Forty-four typical applications are listed together with design and operating information on two types of electron microscopes. Data cover viewing screen, accelerating potential, magnification, electron diffraction, focus determination and control, image stability, resolution and other features of this Norelco equipment.

New Stall Type Torque Motor

The New Reuland torque motors can be stalled or "locked", with current on, without damage to the motor. The unit automatically adjusts its speed to intermittent load changes, at the same time maintaining a constant power.

★ ★ ★

Typical applications for this new motor include winding film or wire onto spools; closing **and holding closed** electrical contactors, valves and locking devices; opening **and holding open** brakes; lifting and holding up cams. Door operators, machine tools and many pump applications are additional uses that take advantage of the unit's unique electrical characteristics.

★ ★ ★

These torque motors are also ideally suited to tandem installations where another motor "sets the pace." An example of this is the winding of scrap as it is being slit from a metal sheet.

★ ★ ★

Ratings are measured in foot pounds of torque rather than horsepower. Standard units from ½ through 10 ft. lbs., with across-the-line LOCKED SERVICE duty of 5%, 10%, 25%, 50% and 100% are available (maximum stalls are 5, 10, 20, 60 minutes and continuous, respectively).

★ ★ ★

Reuland Torque motors are also available with right-angle worm or Helical gear reducers. For selection chart and other engineering data, write **Reuland Electric Co.,** Alhambra, California.

Nord Improves Di-Profiler

A new high precision driving unit connecting with the flexible shaft of the Di-Profiler has been announced by **Nord International Corp.**, and a new, more powerful motor and an improved foot control rheostat have been added to eliminate overheating that sometimes occurred under continuous hard usage.

★ ★ ★

With the added power the Di-Profiler operates at any desired speed from 0 to 15,000 strokes or revolutions per minute, depending upon whether it is used with a rotary fixture or as a reciprocating unit. When used as a reciprocating unit, the fine stroke adjustment and compensating spring insures safe and exact filing even of dead end holes. By attaching the Di-Profiler to a drill press or lathe carriage you can use it also for fine filing and finishing without fear of breaking your tools since the compensating spring permits full depth filing without strain on any working part.

★ ★ ★

The new foot control rheostat is designed like an automobile foot accelerator, allowing the operator to rest his foot while using the unit.

★ ★ ★

The new Di-Profiler is designed to fit the hand. It is 5½" long x 4¾" deep x approximately 2" diameter at the center gripping point and has a ball bearing spring clip assembly to the flexible drive shaft.

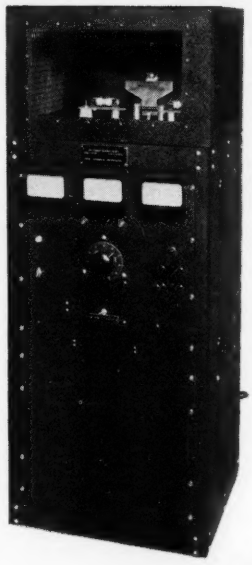
★ ★ ★

The complete tool with motor, rheostat, flexible shaft, cable and a full set of standard attachments is available immediately from stock. For further details contact NORD INTERNATIONAL CORP., 449-246 W. Central Ave., Orange, N. J.

New Products List Issued by Acheson Colloids

A new 4-page booklet, containing a list of 40 dispersions of colloidal graphite, molybdenum disulfide, vermiculite, and zinc oxide, has been issued by the **Acheson Colloids Co.** Typical applications,

AC/DC HIGH POTENTIAL TEST SETS

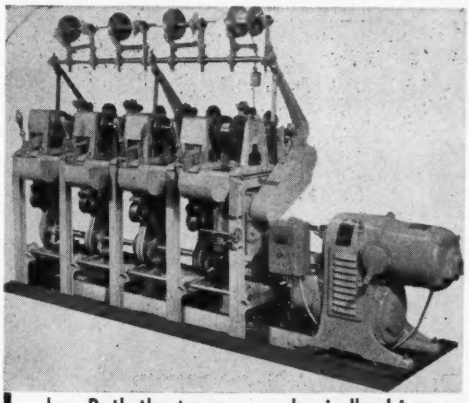


- High sensitivity circuit breaker, continuously adjustable.
- Non-destructive testing.
- Continuously adjustable output voltage, AC or DC.
- Voltmeters across output.
- Complete series—up to 100 KV units.
- Optional burn feature.

OTHER PRODUCTS:
Continuous Insulation Testers for Magnet Wires.
SPARK TESTERS
SENSITIVE HIPOT TESTERS

Write for bulletin

PESCHEL ELECTRONICS, INC.
13 Garden Street Tel: NE 6-3342 New Rochelle, N. Y.



1900-HV MULTIPLE SPINDLE SPOOLER

SPECIFICATIONS
Size Range: .010" to .080" or heavier if soft and many flat wire sizes.
Max. Spool Size: 16" flange diameter.
Capacity: usually 4 to 8 spindles.

The 1900-HV Spooler is a rigid, precision machine which will consistently produce a uniform, dense wire lay. Both the traverse and spindle drives are regulated through wide-range, stepless, variable speed units, eliminating change gears. The 1900-HV is completely adaptable to your particular constant or changing demands. All controls are positive. Adjustments are made accurately with the spooler in operation and without tools.

Both smooth acceleration and rapid stopping is obtained through a single lever at each station. Spool changing is simple and rapid. Anti-friction bearings are used on all shafting and spindles.

Your special requirements can be incorporated into the design. Each machine is delivered ready for operation from your power supply. Payoff stands furnished as extras.

Consult us on your spooling problems.

ROBERT J. EMORY COMPANY
31 East Runyon Street Newark 5, N. J.

HIGH QUALITY
COPPER and BRONZE WIRE
All sizes of Fine Wire
BARE and TINNED

SPENCER WIRE CORPORATION
555 LEHIGH AVENUE • UNION, N. J.
Plants at UNION, N. J. • Telephone: UNionville 2-7950

densities, carriers, and other important data, are given. Recent additions to the list are dispersions which offer the advantages of the valuable new epoxy resins as bases for 'dag' colloidal graphite and molybdenum disulfide dry-film coatings.

★ ★ ★

Copies of "A List of 'dag' Dispersions for Industry" are available free of charge and may be obtained by writing to Acheson Colloids Company, Division of Acheson Industries, Inc., Port Huron, Michigan.

Bulletin on Stapling Machines

A series of packaging machines handling single end closings of partial or full overlap cartons, telescope or center-slotted cartons of fibre or corrugated board is outlined in bulletin PR/601, prepared by **International Staple & Machine Co.,** Herrin, Ill. The booklet gives specifications and prices on the International Staple Princess series which includes models with two stapling heads and models with one stapling head.

★ ★ ★

Wiring, air and air line requirements and components are listed on the back cover of this eight-page, two-color booklet, as well as operating details on the series. Illustrations show the type of packages the machines will handle, weight of carton board, plus a page of diagrams explaining the operation of the company's exclusive Retractable Anvil Stapling Head. How the machines operate, amount of floor space needed, safety features, amount of work turned out, is explained.

★ ★ ★

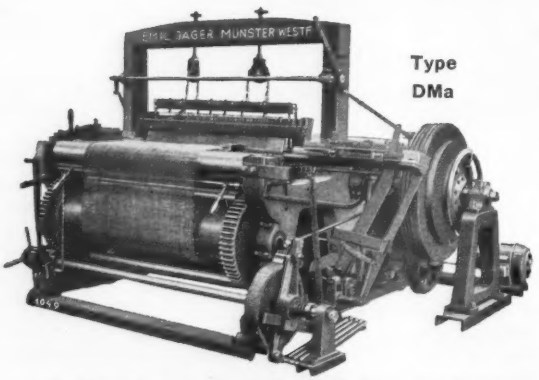
Booklets available on request from International Staple & Machine Co., 801 Herrin Street, Herrin, Illinois.

Catalog on Tensioning Elements for Prestressed Concrete

John A. Roebling's Sons Corporation, Trenton, N. J., has issued a new catalog on "Tensioning Materials for Prestressed Concrete." The catalog gives detailed information and charts on characteristic properties of Roebling

JAEGER
Automatic Wire Weaving Looms

Other products we furnish:
Fourdrinier Looms
Semi-Automatic Looms
Mesh Assembling Looms
Automatic Pirn or Bobbin winders
Beaming Devices
Weaving Reeds
Wire Crimpers for wires up to ⅝" dia.



Type DMa

Weaving Range 1 to 20 mesh per inch with wires up to .100". When used semi-automatically, meshes with wires up to .240" dia. can be woven.

We have a complete line of Looms from the coarsest mesh up to 450 mesh per inch.

For further information write us giving details.

CEDAR WEST TOOL COMPANY, INC.
88-92 West Street, New York 6, N. Y.

wire and strand, and includes descriptions and photographs of various construction jobs in which prestressing has been used.

★ ★ ★

Featured in the new Roebling catalog are uncoated prestressed concrete strand for pre-tensioned bonded design, anchor fittings for post-tensioned design, and post-tensioned design as applied to the Cañas River Bridge in Cuba and a California garage which used four of the largest prestressed concrete girders ever fabricated. Tensioning applications are also described and illustrated by sectional drawings.

★ ★ ★

Roebling has been a pioneer in the development of prestressed concrete, and the company is one of the nation's major suppliers of tensioning elements. Prestressed concrete is gaining wider acceptance as contractors and builders learn the value of prestressing for various construction applications.

Reprint on Research Rolling Mill Available

To assist engineers interested in equipment for experimental rolling of metals such as titanium, molybdenum, tungsten, zirconium, stainless steels and other alloys, reprints of the article "A Combination Mill for Experimental Rolling of the 'New' Metals", by **A. I. Nussbaum,** are available from the **Stanat Mfg. Co.,** 47-28 37th Street, Long Island City 1, N. Y. Reprinted from the April 1954 issue of METAL PROGRESS, the technical discussion centers on hot and cold rolling with a new two-high/four-high combination mill especially designed for research laboratories and pilot production plants.

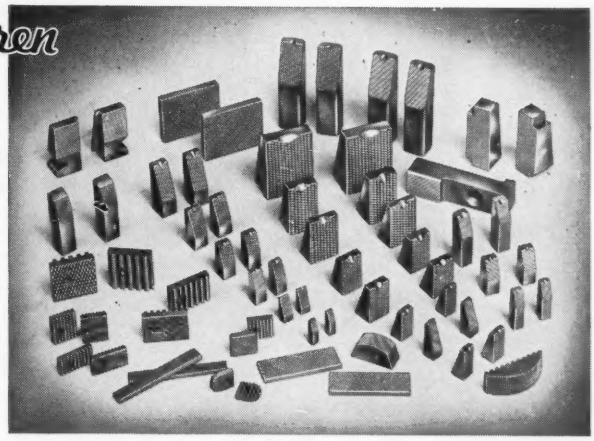
Kerite Celebrates Centennial Anniversary

Official greetings from **Gov. John D. Lodge, Rep. James T. Patterson,** (Conn.) and leading industrialists of the state marked the official centennial observance at Shelton, Conn., on June 10th, of the establishment of the **Kerite Insulated Wire & Cable Company.** The event was featured by the presence of employes' families and

Sjogren

JAWS....

for Wedge Grips, Pullers and Tensile Testing Machines of all makes are available either from stock or manufactured to order. A Sjogren jaw, made to meet your requirements, guarantees you service.



SINCE S&S 1927

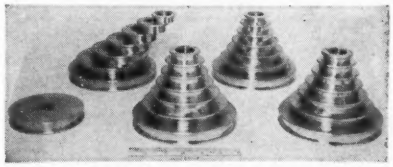
Used by Wire Men Who Want the Best!

SJOGREN TOOL AND MACHINE CO., INC.

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

14 SWORD STREET
AUBURN
MASSACHUSETTS

PK HARDSURFACING PAYS!



SYNCRO A-16 DRAW RINGS

Pictured at left and below are some wire drawing machine blocks. Many other parts can be hardsurfaced to advantage.

VAUGHN 20" BLOCKS

MORGAN-CONNOR 22" BLOCK

Parts last 3 to 10 times as long as standard equipment—Saves downtime — Cuts wire rejections — Increases production.

OTHER APPLICATIONS

Rollers and Idlers
Sheaves and Pulleys
Steel Crane Wheels
Hot Shear Blades

PARKWAY-KEW CORP.

P.O. Box 504 **Tel.: Metuchen 6-4747** **Menlo Park, N. J.**

FOR
EXTRA TONNAGE
FROM YOUR BAR STOCK AND WIRE DIES

COAT WITH
BORAX 5 MOL.

Borax and Borax 5 Mol Offer Many Advantages as a Coating Material

Here is dust-free, granular material that is readily soluble in water and dries quickly. The residual film is tight yet pliable... won't flake off! Borax is safe to use, easy to handle, and non-irritating to the skin. You can feed stock faster and you get longer, more accurate performance from your dies.

Check these advantages of borax-coated stock:

- COMPATIBLE WITH DRAWING LUBRICANT
- BETTER WORKING CONDITIONS
- FASTER BUTT WELDING
- LONGER DIE LIFE
- LONGER STORAGE SAFETY
- CLEANER TO HANDLE IN TRANSIT

Write for Technical Data Sheet #2 WD

PACIFIC COAST BORAX CO.
DIVISION OF BORAX CONSOLIDATED, LIMITED
NEW YORK • CHICAGO
LOS ANGELES • CLEVELAND
PHILADELPHIA

MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS

their friends, an out-door luncheon, conducted tours of the plant and exchanges of congratulations.

★ ★ ★

Supplementary to the program of events and the historical sketch of the company recently announced, the centennial observance was highlighted by the publication of a historical note. It was written November 18, 1868 by **Samuel F. B. Morse,** inventor of the telegraph. Writing to **Austin Goodyear Day,** who founded the company in 1854, Mr. Morse commented as follows:

"I have been gratified in hearing your explanation of you rnewly discovered compound called "Kerite" and in examining the various specimens of it to telegraphic conductors, as an insulator whether in the atmosphere, earth or beneath the water, it appears to me that you have discovered the most perfect as yet, of all insulating substances for submarine telegraph cables. The tests to which it has been submitted and by which it has been proved to resist the deteriorating effects of ozone of the atmosphere appear perfectly satisfactory, and I, therefore most cheerfully and cordially join with those who have tested its efficiency in congratulating you on your success in introducing so valuable an aid to the telegraphic enterprise of the world."

★ ★ ★

The Kerite Company has been supplying the world since with insulated wire and cable and has filled several important government contracts in connection with the activities of the Atomic Energy Commission.

A New Stress Measuring Instrument

The Joseph B. Kushner Electroplating School announces the development of a new instrument for measuring stresses in chemically deposited metals, electroplated metals and paint, lacquer and plastic films. These stresses, caused by the shrinkage or expansion of the deposited layers, are of great practical and theoretical importance in connection with the structure of the deposits. The instrument, for which a U. S. Patent is now pending, is called a STRESOMETER. It can readily measure stresses ranging from 100,000 lbs. per sq. inch in tension (contractile) to 50,000 lbs. per sq. inch in compression (expansive).

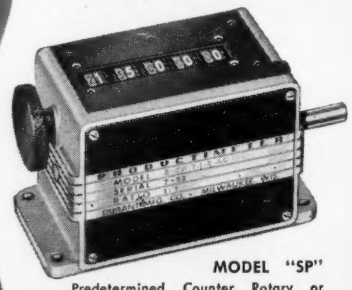
★ ★ ★

The STRESOMETER eliminates

Predetermined Runs are PROFITABLE Runs

MODEL L-R-16-Q
Wire Measuring Machine with Predetermined Counter Speed 2000 F.P.M.

ELECTRIC "SP"
Predetermined Counter Counts Electrically — Lights LIGHT, Rings BELL, Starts or Stops MACHINE.



MODEL "SP"
Predetermined Counter Rotary or Stroke Models Lights LIGHT, Rings BELL, Starts or Stops MACHINE, mechanically.

Send for Catalogs

DURANT MFG. CO.
1918 N. Buffum St. 118 S. Water St.
Milwaukee 1, Wis. Providence 3, R.I.
Representatives in Principal Cities

PRODUCTIMETERS Count Everything
75th ANNIVERSARY

BUNCHING
(TWISTING)
AND
STRANDING
IN THE WIRE AND
GENERAL MANUFACTURING
PROCESSES

SPECIALIZED
ENGINEERING
AND
SPECIALIZED
FACILITIES
AT YOUR SERVICE

Expanding application of twisting principles to the production of many products is reflected by an ever-increasing demand for both H-D standard equipment as well as machines especially engineered to solve varied production problems. Week after week surprising new uses are developed through the close cooperation of our engineering department with manufacturers in many fields.

Write today for our New Technical Bulletins. Tell us what you make—or contemplate making and your inquiry will receive prompt attention.

HASKELL-DAWES
MACHINE CO., INC.
2231 E. ONTARIO ST.
PHILADELPHIA 34
PA.

completely the difficult, tedious and time-consuming procedures formerly required for making stress measurements, particularly on electroplated metals. Stress measurements are easily, accurately and rapidly made with this instrument.

★ ★ ★

It can be used directly in the plating tank for control purposes, or it can be used for research with a separate tank, for correlating such factors as atomic structure, current density, pH and temperature, with stress. Stress readings may be taken continuously as a function of time, or individually, in connection with the thickness of the deposit under test.

★ ★ ★

Two models of the STRESOMETER are available. One is of high temperature lucite and is used for electroplated and chemically deposited metals; the other is of metal and is used for testing paint, lacquer and plastic films.

★ ★ ★

Those who wish further information are invited to write to the Joseph B. Kushner Electroplating School, 115 Broad Street, Stroudsburg 1, Pa.

High Temperature Hook-Up Wire

Teflon insulated hook-up wire made by an improved taping and sintering process is available for operating temperatures from —100°C to 250°C. The manufacturing process results in a wire of unusual smoothness and uniformity. Applied to standard wire sizes from AWG 28-14 the insulation has high dielectric strength, very high insulation resistance, zero water absorption and immunity to all chemicals and solvents except molten alkaline metals. Sizes having a nominal insulation thickness of 8 mils are tested at an AC potential of 3000 volts rms, and are available in eleven solid colors. This wire is ideal where miniaturization and high temperature resistance is required.

★ ★ ★

For further information, write to **SPRINGFIELD WIRE & TINSEL COMPANY**, 70 Leete Street, Springfield, Mass.

START
SAVING
in your
Die Finishing
Rooms
•
Double your
Refinished
Tungsten Carbide
Die Production
CUT
labor costs
½
with the
New type "M"
automatic

DYKREX
"IT CORRECTS THE DIE"

Polishing Machine

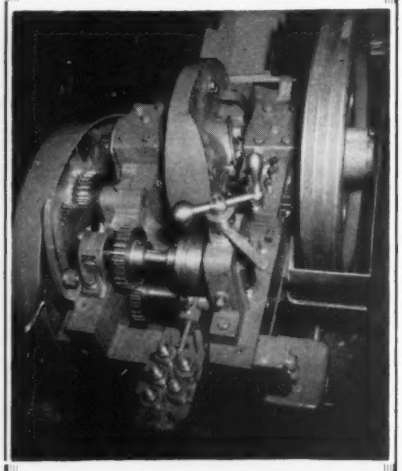
It's factory assembled—just plug it in to nearest electric outlet.

ROOS TOOL & MFG. DIVISION
Dykrex Corporation of America
manufacturers of
Wire Die Finishing Machinery
33 Bloomfield Avenue
Newark 4, N. J.
Western Union
Teletype Service
QAB-WUX—Montclair, N. J.
The Standard of the Wire Industry

1000 STAPLES PER MINUTE!!!

are made on the

HUMPHREY STAPLE MACHINE



Top View, showing Fly Wheel & Gears

MAKES: FENCE Staples
Poultry Netting Staples
Double Pointed Tacks

48 different leg lengths
Gauges 8 through 18

Efficient, Compact
Easily Adjustable

Models: Belt or Motor Drive

Prompt Deliveries

For further information write

SOLE DISTRIBUTORS

SEYBOLD
TRANSWORLD EXPORTERS

122 East 42nd Street
New York 17 N. Y.
USA.

Cable Add: "SEBOLDEX-NEW YORK"

The Impact of Changes in Defense Spending on Southern California Industry

(*Continued from page 866*)

A question that arises at this point is what would happen in the Los Angeles Metropolitan Area if defense contracts effective in this territory were cut back. The Southern California Research Council has made a number of interesting estimates along these lines. In terms of insured employment they indicate that a 25% cut would result in a 7% reduction in the total civilian labor force or direct unemployment of 68,000 workers; a 50% cut would reduce employment by 10% or by 120,000; a 100% cut, of course, would mean the direct unemployment of 230,000 or 17%. Compare this with an insured unemployment rate of 13.6% of the total civilian labor force in March, 1949.

★ ★ ★

The above figures still leave the problem of just what would be the effect of a possible cut in defense expenditures in the Los Angeles Metropolitan Area on workers other than those engaged directly in a defense industry. It is only possible to hazard an educated guess in this matter. Assuming the reasonable possibility of a 25% cut in defense expenditures in the Los Angeles Metropolitan Area in 1955, the median estimate appears to be about 150,000 employees or 9% of the total insured labor force. The final effect, of course, would depend upon general business conditions and investment opportunities at that time.

★ ★ ★

There are certain sustaining factors in the Los Angeles Metropolitan Area that might somewhat offset a decline in defense expenditures in the region. This area has a heavy defense commitment in the electronics and aircraft industries, both of which have a high priority in the current defense program. Then, too, the rate of population growth for this region during the decade 1940 to 1950 was about three times that of the nation—49.8% versus 14.5%—a rate forecast for continuance during the present dec-

WHAT HAPPENS TO LOOSE ENDS?

Some people believe in tying up the loose ends. We believe there's an easier way of eliminating them.

Loose, frayed ends on glass-braided wire that has been stripped and tinned are a real problem. They look messy. They get in the way. And the increased diameter of the wire defeats the engineer's efforts to make room for the greatest possible number of wires.

Our laboratory's contribution to the solution of this problem was to develop a NELCO saturant that does a slick job of controlling and keeping flat those frayed ends of glass braid. This is the saturant's primary job but it has some other very fine qualities.

First of all, it operates as a barrier coat between the primary insulation and subsequent lacquering. This results in much higher insulation resistance.

Secondly, it resists discoloration due to ultra-violet exposure.

Thirdly and importantly, this NELCO saturant in no way adds any flammability to the finished wire.

And finally, the saturant is easily applied either in a lacquering tower or during the braiding operation.

Instead of worrying, wondering what to do about those loose, frayed ends on your glass-braided wire, turn the problem over to us and we'll show you how to make every strand lie down in its proper place.

NEW ENGLAND LACQUER CO.

150 King Philip Rd., East Providence, R. I.

ade. More population means more mouths to feed in the short run but, in the long run, provides more hands to work and a larger potential market.

★ ★ ★

Further, there is a great need for more public works in the Los Angeles Metropolitan Area. Sufficient bond issues have been approved to give an approximate 2-year backlog of such projects at present. The school building situation well illustrates the public works need. Los Angeles grew 50% from 1940 to 1950 but the preschool segment of the population expanded 125% during the same period while the size of the age group leaving high school via graduation increased only 7%. School housing needs alone are an urgent and significant part of the current and projected public works program.

★ ★ ★

Finally, the 1953 survey of the Southern California Research Council indicated that 87% of the business executives answering the questionnaire planned as great an expenditure of capital in 1954 as in 1953. This figure seems borne out in practice by preliminary figures now available for 1954. Such a confidence in the future, if nation wide, can be a major factor in eventually dispelling any fears of a depression in the next few years that may result from a decline in defense expenditures.

Sources: (For figures only; the interpretations are my own)

FORTUNE magazine

Southern California Research Council

Federal Reserve BULLETIN

Twelfth Federal Reserve District REVIEW

Announces Thread Engineering Advisory Service

The services of a staff of fastening engineers are available for a new service offered free of charge to companies having problems with screw thread fastenings by **Heli-Coil Corporation,** manufacturer of wire screw thread inserts.

★ ★ ★

These experienced engineers are available for consultation on problems pertaining to: (a) tapped thread strengths in brittle metals, light metals, plastics or wood; (b) space limitations caused by tight design specifications; (c) frictional wear on threads subject to frequent disassembly; (d) weight requirements set by high performance goals; (e) vibration wear on threads subject to extreme oscillation; (f) corrosion resistance of threads subject to high humidity or reactive atmospheres; or (g) thread deterioration caused by high temperatures.

★ ★ ★

An analysis of the problem including controlled tests in the Heli-Coil Research and Development Laboratory, when these are necessary, will be made without obligation. Reports based on these studies, including recommendations as to the most effective and economical solution to the problem, will be submitted to the inquirer.

★ ★ ★

No problem will be considered too simple or too complex to be handled. Problems on either large or small equipment and involving

ALUMINUM and COPPER
FINE WIRE
BARE AND TINNED CONCENTRIC STRAND
— AT ATTRACTIVE PRICES —
Arcola Wire Company
ONE ERIE STREET
PATERSON 4, N. J.
Telephone:
Mulberry 4-1441

MUSIC WIRE and SPECIAL WIRES
Music Wire for Industrial Purposes
211 sizes Bright Polished, .0015" to .3437"
45 sizes Bright Tinned, .003" to .125"
Aluminum—Annealed—Belt Lacing—Brass, Soft and Spring—Copper, Bare and Tinned
Coppered Steel Spring—Galvanized—Tinned
Monel—Nickel Silver—Pure Soft Nickel—Oil Tempered, Steel Spring, Black Finish
Phosphor Bronze, Spring Temper—Pure Iron Wire—Resistance Wire,
Hoskins Chromel "A"—Stainless, Soft and Spring Temper—Tag Wire, 1000
in an Envelope—Florist Wire—Spooled and Coiled, 1/4-1/2-1-5#
Wires Straightened and Cut to length—Small Gauges—Small orders our specialty
Wires and Strands for the fishermen. Trolling Wires, Copper-Monel-Stainless.
Leader Wires, "Wilstabrite" Stainless and "Silverbrite" Music.
THE MALIN & COMPANY
2514 Vestry Ave. Established in 1884 Cleveland 13, Ohio

REELS • SPOOLS
ALL SIZES
WOOD - PLYWOOD - WOOD - METAL
RETURNABLE NON-RETURNABLE
Samples and Prices on Request
DURKEE MFG. CO. PINE RIVER, MINN.

THE BETTER YOUR WIRE . . .
THE BETTER YOUR PRODUCT!

Choose *Cortland* GALVANIZED WIRE

Fine products are made from fine-quality materials. That's why so many fabricators and formers select Cortland Brand specialized low carbon wires. Cortland Brand wires are among the finest available . . . made from the best corrosion-resisting, open-hearth steel in Wickwire's own mills. Use them for your products . . . in any of the following types, sizes and finishes.

Cortland Brand

SIZE: coils, spools or straightened cut to length.
FINISH: plain, galvanized, coppered or tinned.
TYPE: stone wire, bookbinder, flat, etc.

WB

WICKWIRE BROTHERS, INC. **CORTLAND, N.Y.**

30,000,000 FEET OF WIRE FROM "BRIDGEPORT" CARBIDE NOZZLES!

These are made for use in extruding machines in covering electric wire with rubber or plastics.

Carbide nozzles are giving 300 times the production secured from those made of tool steels.

Precision-made carbide tools, any type, made to your order.

WIRE TOOL DIV., BRIDGEPORT JIG BORING COMPANY

303 STRATFORD AVE. • BRIDGEPORT, CONN.

***Buy the Best:* MONTGOMERY SILVER-COATED COPPER WIRE**

Round for Kel-F & Teflon Insulated Radio and Instrument Hook-up Wire and UHF Cables.
Flat for Tinsel Ribbons and Tinsel Garlands.

Bare Electric Tinsel Conductors for Telephone-Razor-Hearing Aid Cords.

NEVA-TARN—Metallic Yarns—Non Tarnish—for knitted and woven fabrics. Est. '871

THE MONTGOMERY COMPANY

25 CANAL STREET Tel.: National 3-3338 WINDSOR LOCKS, CONN.

WE BUY WE SELL

We Pay Highest Prices for Used Machinery

5 - SYNCRO MODEL BB-13 13 DIE WIRE DRAWING MACHINE.

WILL DRAW FROM NO. 12 TO NO. 24

All Machines Reconditioned in Our Own Shop

WIRE & TEXTILE MACHINERY INC.
P. O. BOX 436, PAWTUCKET, R. I.

either standard or special design requirements will receive equal attention.

★ ★ ★

Companies interested in this facility should write to Thread Engineering Advisory Service, Heli-Coil Corporation, 1502 Shelter Rock Lane, Danbury, Conn.

Successful Regional Meeting Held in California

(*Continued from page* 864)

The Program Committee

The success of this meeting can be attributed to the thoughtful planning and hard preliminary work of the Program Committee, who endeavored to freshen the West Coast programs with new ideas, adapted their circumstances. as indicated by experience with previous meetings. Especially is credit due to **Earl Potter** and **Joe Conlon,** who did most of the heavy work after the Committee had formulated its plans. In the course of preparation for this meeting Mr. Potter entertained his committee members at three buffet luncheon meetings to organize the program. The committee consisted of:

CHAIRMAN

Earl R. Potter, President,
Industrial Wire Products Corp.,
Los Angeles.

MEMBERS

Harold Hansen, District Sales Manager,
Colorado Fuel & Iron Corp.,
Los Angeles.
J. W. Egan, Sales Engineer,
Bethlehem Pacific Coast Steel Corp.,
Los Angeles.
Ray D. Mack, District Manager,
Carboloy Dept. of General Electric Co.,
Huntington Park.
E. N. Coffin, Sales Engineer,
Columbia-Geneva Steel Div.
U. S. Steel Corp.,
Los Angeles.
J. F. Conlon, Controller,
Davis Wire & Cable Corp.,
Los Angeles.
A. A. Olson, Supt., Wire Mill,
Bethlehem Pacific Coast Steel Corp.,
Los Angeles.
A. B. Kreider, Asst. Met. Eng.,
Bethlehem Pacific Coast Steel Corp.,
Los Angeles.
John D. Wright, Tech, Field Rep.,
Columbia-Geneva Steel Div.,
U. S. Steel Corp.,
Los Angeles.
James Wilson, Plant Manager,
Fanner Metal Products Co.,
Los Angeles.

Robert E. Olson, Sales Dept.,
Colorado Fuel & Iron Corp.
Los Angeles.
G. W. Morris, Asst. Supt., Wire Mill,
Bethlehem Pacific Coast Steel Corp.,
Los Angeles.
P. J. Siemonsma, Asst. Treasurer,
Planett Mfg. Co.,
Downey.
James Nixon, Sales Dept.,
Colorado Fuel & Iron Corp.,
Los Angeles.

★ ★ ★

This meeting was noteworthy for the interest and decorum of those attending. In every way it equalled regional meetings held so far in the East. It would seem that the real reason for the existence of **The Wire Association** has at last been discovered and recognized on the Coast and the Committee is to be commended for a truly excellent program, conducted on a high plane. There were more wire operating and management people here than ever before.

★ ★ ★

The Directors and Officers of the Association salute and thank the Committee members individually and collectively for the fine result.

New Catalog Issued by Firth Sterling

A new 48-page catalog, effective February 15, 1954, has been distributed by **Firth Sterling Inc.**, Pittsburgh, to all authorized distributors throughout the nation. Published in two colors, Distributor Catalog #6 encompasses the distributor line of steel and Firthite carbide products.

★ ★ ★

Price adjustments as well as additional specifications are reflected in the new catalog. Hitherto not shown in any other industrial catalog, Distributor Catalog #6 lists price per piece on unground bits. This feature was added for the convenience of authorized Firth Sterling Distributors. Other new features include prices and specifications on standard tips for circular saws, boring tools, and Mechaniclampt toolholders and inserts.

★ ★ ★

Circle C ground bits, high speed toolholder bits, Blue Chip high speed drill rod, and boring tools reflect price adjustments.

Cut Your Product Cost . . .
Stop struggling with wire worries. There's a Continental wire to help cut products costs — to add sales appeal. Let us know about your problem . . . Let Continental's helpful wire service work for you.
CONTINENTAL STEEL CORP.
STEEL
CONTINENTAL
WIRE
KOKOMO, IND.
*Trade Mark Reg. U. S. Pat. Off.

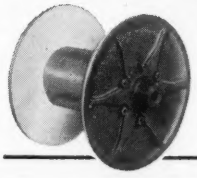
CONTINENTAL STEEL CORPORATION
GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF Manufacturer's Wire in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

MILTON MACHINE
RUGGED in design . . . DEPENDABLE in service!

Save on replacement and maintenance!

RUGGED STEEL HEAVY DUTY PROCESSING REELS



Having trouble with light weight reels failing in heavy duty service? Send us a sketch or print stating the limiting dimensions and service required, we'll be glad to tell you about our facilities for supplying the wire rope and cable industry with special heavy duty processing reels, spools or bobbins. WRITE FOR BULLETIN 52-W.

MILTON MACHINE WORKS, Inc.
DESIGNERS — ENGINEERS — MANUFACTURERS
MILTON • PENNA.

Specializing in

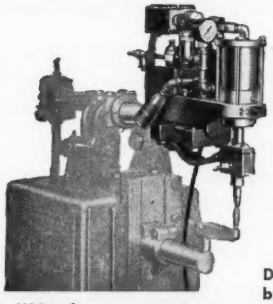
WIRE CLOTH WEAVING

• • • For every metal
Up to the finest mesh in bronze and stainless steel.

Write for details

GANTOIS

SAINT-DIE (VOSGES) FRANCE



Write for our current available Welder List

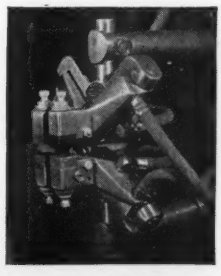
Solve Your Welding Problems at HOFFMAN-CHICAGO

Spot, Butt, Seam, Gun, Flash, Projection, Multi-Point and Stud Welders

NEW • USED • REBUILT

← WELD-AIR-MATIC
Spot welder air conversion unit. Tests prove 10,000 welds hourly on continuous daily schedules.

BUTT-ON-SPOT →
Automatic butt welding attachment. Water-cooled, fits any spot welder with minimum horn clearance of 7".



DIES: complete facilities to design and build special welding dies and fixtures for your piece parts.

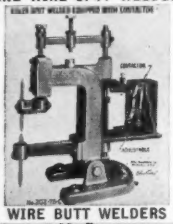
ACCESSORIES: complete stock of Welder Controls, Holders, Tips, and Bar Stock.

ROBT. W. HOFFMAN CO., INC. 48 South Clinton Street, Chicago 6, Illinois

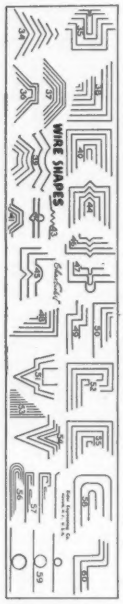
For FINE WIRES from .001" to 1/16"

High Speed Wire Cutters and Benders. Wire Spot Welders and Wire Butt Welders. Ask for test samples. Established 1920.

FINE WIRE SPOT WELDERS



Indexing Turntables
Cam Milling Service

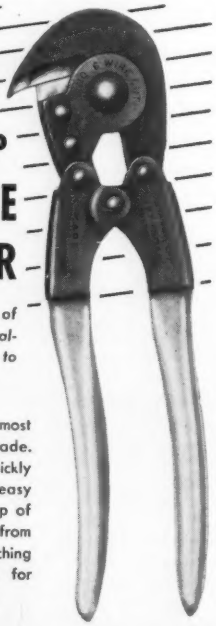


WIRE BUTT WELDERS

CUTTING & BENDING MACHINES

EISLER ENGINEERING CO., Inc.
747 So. 13th St., Newark 3, N. J., U. S. A.

HKP
PORTER HANDKLIP 6C WIRE CUTTER



For FREE CUTTING of wires, cable, rods, baling wire and bolts up to medium hardness.

One of the handiest, most useful cutters ever made. Parrot-beak jaw quickly locates material for easy cutting. Protruding tip of jaw prevents wire from slipping, aids in stretching wire and is great for pulling out staples.

Essential equipment for cutting high tensile communication and power wires used in rural electrification (Model 6B with special hard cutting edges). See your supplier.

H. K. PORTER, INC.
Somerville 43, Mass.
Porter Cutters Porter Pruners
PORTER-FERGUSON Autobody and Fender Repair Tools

Wire Flattening—An Appraisal of Today's Theory and Practice

(*Continued from page* 859)

d=diameter of round wire, in.
h=thickness of flat wire, in.
b=width overall of flat wire, in.
R=radius of roll, in.
L=projected contact length, in.
x=lever arm of rolling force, in.
T=total rolling torque per mill, in.—lb.
V=rolling speed, ft. per min.
N=total rolling horsepower per mill.

★ ★ ★

Ignoring the slightly convex shape of the flattened wire edges and considering the projected area of contact to be a parabolic segment, then:

$$A=\frac{2}{3}\,b\,L \text{ and, since}$$

$$L=\sqrt{R\,(d-h)},$$

$$A=\frac{2}{3}\,b\sqrt{R\,(d-h)}.$$

Now, $P=p\,A$, so that

$$P=\frac{2}{3}\,p\,b\sqrt{R\,(d-h)} \quad \ldots\ldots\ldots \quad (4)$$

★ ★ ★

Assuming the neutral plane to pass through the center of area of the parabolic segment, then:

$$x=\frac{2}{5}\,L=\frac{2}{5}\sqrt{R\,(d-h)}, \text{ and}$$

$$T=2\,P\,x=2.\,\frac{2}{3}\cdot\frac{2}{5}$$

$$.p\,b\sqrt{R\,(d-h)}\,.\sqrt{R\,(d-h)}$$

$$=\frac{8}{15}\,p\,b\,R\,(d-h) \quad \ldots\ldots\ldots \quad (5)$$

★ ★ ★

Finally, the rolling horsepower:

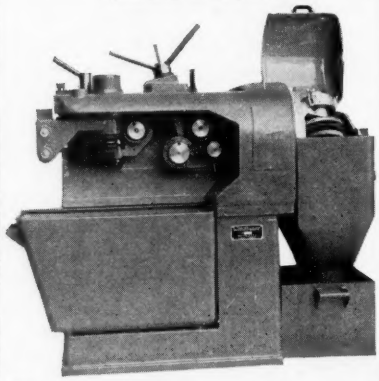
$$N=\frac{V\,T}{33{,}000\,R}=\frac{8\,V\,p\,b\,R\,(d-h)}{15\,.\,33{,}000\,R}$$

$$=\frac{V\,p\,b\,(d-h)}{62{,}000} \quad \ldots\ldots\ldots \quad (6)$$

★ ★ ★

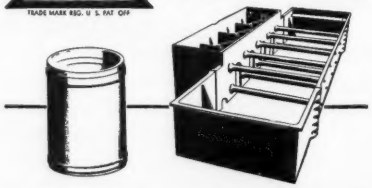
Hence, to obtain the rolling horsepower, multiply mill speed by specific rolling pressure by flat wire width by (initial wire diameter minus flat wire thickness) and divide by 62,000. In using the

LINÉ-GORCY
MECHANICAL
WIRE ROD DESCALERS
(Patented in U.S.A.)



FISHER ASSOCIATES
SOLE AMERICAN DISTRIBUTORS
122 East 42nd Street
New York 17, N. Y.
Telephone: OXford 7-3294

HAVEG PICKLING TANKS



- **Molded into any size or type**
- **Superior corrosion-resistance**

Haveg round or rectangular tanks effectively resist most acids, salts, chlorine and many solvents—even in boiling temperatures as high as 265° F., with a good margin of safety. Haveg is not a coating or lining, but a corrosion-resistant constructional material that can be molded into large, seamless tanks. Such tanks are extremely tough, durable . . . resist thermal shock, will not contaminate product-finishing. In every way, Haveg can be "custom-engineered" to fit your requirements: Tanks, pipe, valves, fume duct, heat exchangers, pumps, agitators.

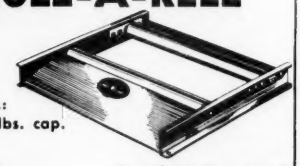
Learn how Haveg can help you combat corrosion, improve production . . . call in a Haveg sales engineer, or write for 64-page Bulletin F-6.

HAVEG CORPORATION
NEWARK 10, DELAWARE
Plant: Wilmington 8, Del. (Wilmington 3-8884)
A SUBSIDIARY OF CONTINENTAL-DIAMOND FIBRE CO.

Simple as A B C

Handle heavy reels easily and safely; remove wire or cable from top or bottom, front or back of reel with

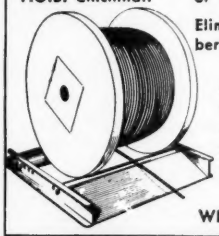
ROLL-A-REEL



Style A:
2,000 lbs. cap.
37.50

Style B:
4,000 lbs. cap.
75.00
F.O.B. Cincinnati

Low slanted front and positive front lock insure quick loading or unloading.



Eliminate jacks, cumbersome handling.

Carried easily to reels, job or storage.

Sold through wholesalers only.

WRITE FOR DETAILS

ROLL-A-REEL
1100 SYCAMORE AT. CENTRAL PARKWAY
CINCINNATI 2, OHIO

MASON STYLE
NON-RETURNABLE
METAL
SPOOLS

THE BEST SPOOLS FOR LESS

STANDARD 5", 6½" x 10½" DIA. SPOOLS TO MEET ALL RIGID NON-RETURNABLE REQUIREMENTS

MASON CAN COMPANY
1949 Dexter Rd., E. Providence 14, R. I.
BRANCH PLANT
Greenville, Ohio

horsepower value obtained thus, it should be remembered that it covers rolling power only and does not include acceleration and roll neck bearing friction powers.

New Auto-Lite Wire & Cable Catalog Out

The latest edition of the Auto-Lite Wire and Cable Catalog, 24 pages of specifications and sales aids, is just off the press, according to **L. B. O'Loughlin,** sales manager, Spark Plug Division, **The Electric Auto-Lite Company.**

★ ★ ★

The catalog contains valuable information on wire, cable and terminals, complete car specifications for battery cables and ignition cable sets, up-to-date specifications for truck and tractor battery cables and the newest Auto-Lite wire and cable displays.

★ ★ ★

It may be obtained from Auto-Lite wire and cable wholesalers.

Quality—A Combination of Horsesense and Statistical Methods

(*Continued from page* 855)

may be defective because of some condition not contemplated by the design engineer. If, however, the operator had been shown how his parts were to be used, this added knowledge might have enabled him to prevent this undesirable condition.

★ ★ ★

In other words, an operator **is** supposed to think and should be encouraged to do so. Most operators have the ability to diagnose and foresee troubles on the job. By supplementing this ability with practical knowledge the Quality Program gains strength.

★ ★ ★

I am also convinced that whereever possible, the operator should be provided with some type of personal Quality record. Of course, the type of record or chart will vary according to the type of job,

METAL BOUND RETURNABLE REELS

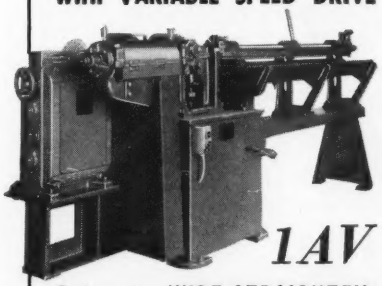
Made in 12" to 24" diameters.

No nails used. *All glued construction.* Made of kiln-dried wood. Special design prevents breaking or splintering of wood, protecting insulated wire from damage.

Write for details

WILLIAM McCASKIE, INC.
FORGE ROAD • WESTPORT • MASS.
Tel.: 145 Est. 1903

Another Great
SHUSTER
"Production Booster"
with VARIABLE SPEED DRIVE



1AV
Automatic WIRE STRAIGHTENING AND CUTTING MACHINE

- Infinite feed changes and control
- Instantly - accurately - economically
- 50 to 200 feet per minute
- Basic Wire 3/32" to 1/4"
- Spring Wire, max. dia. 1/8"

METTLER MACHINE TOOL, INC.
132 W. Lawrence St., New Haven, Conn.
Representatives in principal cities, countries
New York Office: 11 Broadway, WH 4-5480

FOR BETTER PRODUCTION

NATIONAL OFFERS YOU THREE SERVICES

- DIAMOND POWDER RECLAMATION — Exclusive process that gives maximum recovery. Send us your old cotton, die washings, worn wheels and sludge. High salvage percentages will pay you well.
- DIAMOND POWDERS—Complete line of graded quality powders for all lapping and finishing operations on wire drawing dies. First grades only.
- DIAMOND GRINDING WHEELS—A complete line of top-quality wheels for industrial production.

Write for prices.

NATIONAL RESEARCH COMPANY

25530 LITTLE MACK AVE.
ST. CLAIR SHORES, MICH.

YARNS

For electric wire. Acetate, nylon and silk, natural or dyed. Put up on braider tubes, spools or cops.

OSCAR HEINEMAN CORPORATION

Division of Aetna Industrial Corp.

DONALD G. BREWSTER
President and General Manager
2701 Armitage Avenue, Chicago 47, Illinois

Concord Branch
20 N. Kerr St., Concord, N. C.

Sales Agents
C. D. GOTT CO.
1001 Provident Bldg., Chattanooga
Tel. 7-8879

CHARLES T. BRERETON
11 West 42nd St., New York 18, N. Y.
Tel. PE 6-8280

FRANK LUNDAY
P. O. Box 1154, Charlotte, N. C.
Tel. Charlotte 8100

JOHN G. ARCHER
Fourth and Grand
West Des Moines, Ia.

but the method of recording and translating the information is important. Whether the information is in the form of test results, per-cent good, or per-cent defective, is a matter of individual taste, but it should be clear and complete.

★ ★ ★

Before concluding this discussion, I want to make certain that one point is not misunderstood regarding Statistical Methods. While we use and appreciate the value of the simple chart methods discussed, we are also learning to use many other statistical methods for the analysis and reporting of data.

★ ★ ★

In the Technical Managers' office of one department, we maintain what we like to call "Administrative Charts". These charts are

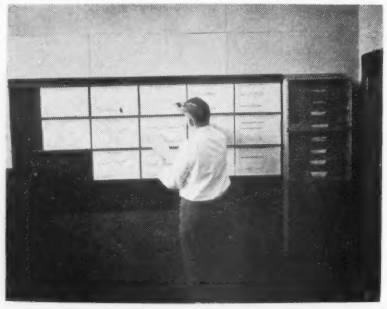


Fig. 7. * * * * * * * * * * *

mounted on a homemade chart board. (See Figure 7.) Data from many processes and inspection positions is summarized and plotted on these charts. The control limits used depend on the characteristics being followed. In many cases, two or three sigma limits are used while others are maintained for observation and have no limits as such.

★ ★ ★

In conclusion, I would challenge you to make liberal use of Statistical Methods wherever possible, but not to lose sight of the greatest asset of all toward quality—the understanding and cooperation of the Man on the machine.

References

"ASTM Manual on Quality Control of Materials"—American Society For Testing Materials.

★ ★ ★

Warner

BELL-MINE LIME

for

WIRE DRAWING

WARNER COMPANY
BELLEFONTE DIVISION
BELLEFONTE, PA.

Sales Office
Philadelphia—Pittsburgh—New York

Forming and Fabricating Booklet

Faster, more economical ways to form and fabricate material through the use of Di-Acro Precision Metalworking Machines is described and illustrated in a new 8 page booklet available upon request from **O'Neil-Irwin Manufacturing Company,** 635 Eighth Avenue, Lake City, Minnesota.

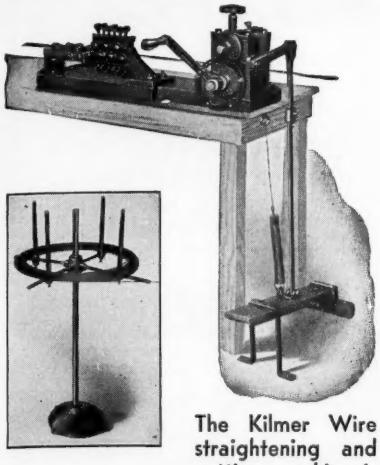
★ ★ ★

According to the company, this booklet entitled "Quick Facts To Aid In Selecting Die-Less Duplicating Equipment" gives a concise summary on both hand and power operated Di-Acro Benders, Brakes, Notchers, Punch Presses, Rod Parters, Rollers and Shears, and briefly explains how they economically duplicate parts to die accuracy without expense and time delay of making special dies.

★ ★ ★

Specifications and capacities on 42 Di-Acro models are listed in easy to read table form.

WIRE STRAIGHTENER



The Kilmer Wire straightening and cutting machine is hand operated and recommended for wire No. 8 to No. 19 gauge.
Wire Reel will handle coils up to 150 lbs. with I.D. adjustments from 7" to 22" and 30" O.D.

M. D. KILMER & COMPANY
4840 BROOKPARK RD.
CLEVELAND 9, OHIO

The Importance of Lime in Wire Drawing

(*Continued from page 850*)

9000 cm^2/g has a mean particle diameter of approximately 2 microns. The ratio of surface area to volume of a particle of this size is 75,848, which is more than 7500 times the ratio for ⅛ inch to ⅜ inch pebble material. Ground impurities in pulverized quicklime remain in suspension and may result in scratched wire surface by adhering to the wire or to the die. It is not recommended as good coating lime.

★ ★ ★

Commercial hydrated lime is not good coating lime because the low specific surface is not conducive to uniform coating or good wire adherence.

★ ★ ★

The Blaine Air Permeability instrument has been successfully used as a control testing instrument for calcium hydroxide solids from suspensions. A modification has been developed to adapt the instrument for this specific use. It is advocated that such an instrument be adapted by the wire-drawing mill as a control test for the successful use of lime suspensions.

Acknowledgment

The author wishes to express his appreciation to the Wickwire Brothers, Inc. for the close cooperation in establishing the findings of this work.

References

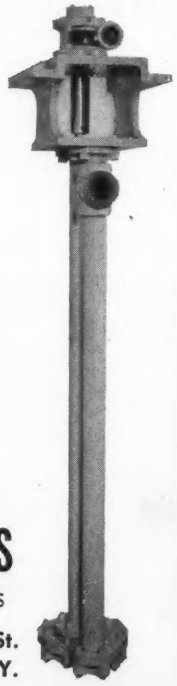
1. **Washburn, D. E. "Lime in Wire Drawing", Wire and Wire Products, November, 1932.**
2. **Carman, P. C., "Shape and Surface of Fine Powders by the Permeability Method", A.S.T.M. Technical Bulletin No. 51, 1941. A.S.T.M. C 204-46T "Fineness of Portland Cement by Air Permeability Apparatus".**
3. **Heisler, Jere Y., "Improved Lime Bath Performance by Recirculation", Wire and Wire Products, November, 1952.**

Useful Metal

Nickel plays a vital role in the construction of radio and television receivers. Without the nickel used in the filaments, the tubes would not function.

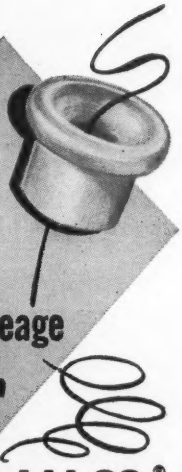
WEMCO MOLTEN METAL PUMP

Air Driven
for
Rapid Transfer
of
ZINC
LEAD
ALUMINUM
TIN
THEIR ALLOYS
and
HEAT TREATING
SALTS



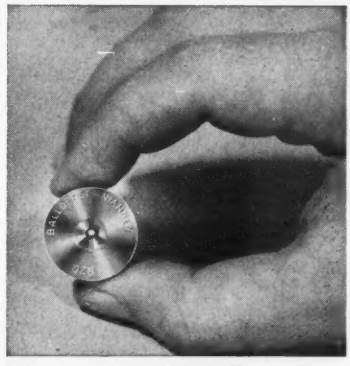
FISHER ASSOCIATES
SOLE DISTRIBUTORS
122 East 42nd St.
New York 17, N. Y.

Get MORE Wire Mileage with HEANIUM®



Quality Guides
Highly resistant to wear.
Decreases down-time and replacement cost.
HEANY INDUSTRIAL CERAMIC CORP.
New Haven, Connecticut

BALLOFFET VIANNEY WIRE DIE CO., Inc.



All sizes from .081" down to .0004" in stock from New York.
Manufacturers of
Quality diamond dies since 1870
BALLOFFET VIANNEY WIRE DIE CO., Inc.
6825 ADAMS ST., GUTTENBERG, N. J.
Tel: Union 3-3393

The TOP DIAMOND DIES are made by PHILIPS

For your most exacting wire drawing requirements, standardize on NORELCO Diamond Dies, made by the master craftsmen of PHILIPS in the world's largest, most modern diamond die factory.

Only the very best South African and Brazilian diamonds are used. Each consists of one closed crystal. Less than .4% of all the diamonds mined meet PHILIPS high quality requirements for purity, structure and shape.

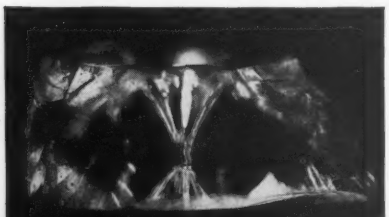
These diamonds are drilled to precision tolerances, varying in proportion to the diameter, normally 0.3 to 3.5 microns. Closer tolerances can be supplied, if required.

Let us quote on your diamond die requirements.

North American Philips Company, Inc.
Elmet Division, Lewiston, Maine

Norelco

Note below the highly polished precision shaped drawing channel of this die for drawing copper which gives a burnished finish to the wire and long life to the die.



MASTER-MADE by PHILIPS

"Mylar" Suited for Electrical Insulation

"Mylar" polyester film has an unexcelled combination of properties — mechanical strength, long term resistance to heat, chemical inertness, and high dielectric strength — that makes it ideal for electrical insulation. The film is used either by itself or laminated to asbestos, rag and kraft papers, glass cloth, unvarnished glass, etc.

★ ★ ★

It has a good dielectric constant, high volume and surface resistivity, good mechanical strength, a low power factor and good insulation resistance. Its high tensile strength (23,500 p.s.i.), a third that of machine steel, permits its manufacture in gauges ranging from less than one mil to 7½ mils (0.0075 inch). In addition, "Mylar" has an unusually high impact strength and long flex life. It retains its properties over a wide temperature range, remaining flexible and stable from —60° to 150°C. It is chemically inert, moisture-insensitive, solvent resistant, and is unaffected by many acids and alkalis.

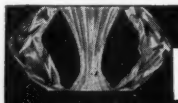
★ ★ ★

The film is suitable for insulation on round and rectangular magnet wire; layer insulation, and insulation between turns in transformer coils; a tough support for mica splittings; as a dielectric in dry and liquid filled capacitors; for slot liner and phase insulation in motors; and tape insulation for motor and generator field coils.

★ ★ ★

Wire Drawing Diamond Dies

COCHAUD WIRE DIE INC.
300 W. 56th St., NEW YORK
Tel. COlumbus 5-1340



DIAMOND DIES
PROFILED DIES
FINE SIZE DIES
VICTOR J. BOULIN INC.
250 E. 43rd St., New York 17, N.Y.

DIAMOND DIES CARBIDE
KELLY
WIRE DIE CORPORATION
19 W. 34th St. New York

DIAMOND AND CARBIDE WIRE DRAWING DIES
DIAMOND POWDER
RUSCH WIRE DIE CORPORATION
Croton-on-Hudson, N. Y.

DIAMOND DIES
.000's to .102"
For many years . . .
Outstanding in quality, workmanship and service.
FORT WAYNE WIRE DIE, INC.
2625 E. Pontiac St., Fort Wayne, Ind.

TUNGSTEN CARBIDE WIRE DRAWING DIES
DESIGNED FOR LONG LIFE AND MAXIMUM WIRE PRODUCTION

Furnished semi-finished to within .001" to .002" of finished size at rough-drilled die prices. Require only light sizing and polishing before using. Our dies embody special design features that make for superior performance.

Also, a full line of carbide tooling for the Cold Heading Industry

EASTERN CARBIDE CORPORATION
NEW ROCHELLE, N. Y.

DIAMOND
and
TUNGSTEN CARBIDE
DIES
for all WIRE DRAWING purposes.
SPECIALISTS IN DIE REPAIR
WORK ON ALL TYPES OF DIES.
UNIVERSAL WIRE DIE CO.
951 Lincoln Ave., Cranford, N. J.
CRanford 6-0116

DIAMOND DIES .0006 - .120 DIAMOND POWDER
INDUSTRIAL
AJAX
SUPPLIES INC.
R.R. 4, P. O. Box 66, Fort Wayne, Ind.

NEW ENGLAND WIRE DIE CO.
7 Forsberg St., Worcester, Mass.
EXPERT RECUTTING
DIAMOND DIES, DIAMOND POWDERS
Eastern Representative of
Ajax Industrial Supplies, Inc.

Diamond Dies for
Wire Drawing
Wayne Wire Die Company
200 Pennsylvania Ave.,
Hillside, N. J.
Elizabeth 2-2456

DIAMOND
WIRE DRAWING DIES
and
DIAMOND POWDER
INDIANA WIRE DIE COMPANY
314-324 E. Wallace St., Fort Wayne, Indiana
Phone: Harrison 4373

Manufacturers of Laboratory Graded Pure
DIAMOND POWDERS
DIAMOND WIRE DRAWING DIES
in .000 sizes
EXPERT RECLAIMING SERVICE
MOLINA
INDUSTRIAL DIAMOND CO., INC.
527 Fifth Ave., N. Y. 17, N. Y.
Tel.: MUrray Hill 7-6825

For complete information, including tables of electrical properties and test methods, write to **E. I. du Pont de Nemours & Co.,** Wilmington 98, Delaware.

Laclede Building New Warehouse in Memphis

A new 36,000-square foot warehouse and fabricating plant for **Laclede Steel Company** will be opened in Memphis this fall according to an announcement by **Charles S. Rogers,** newly appointed manager of Southern sales for Laclede.

★ ★ ★

Mr. Rogers, who has been with Laclede for 34 years, said that the new plant, already under construction, will consist of two sections, each 80 feet wide and 220 feet long. An attached office and service building will measure 45 x 80 feet.

★ ★ ★

Present plans are for this Memphis plant to handle reinforcing bars, wire mesh and building and highway accessories. Located on the Wolf River Canal and near the Mississippi River, the plant will have rail, water and truck service facilities.

★ ★ ★

This new plant, together with similar Laclede units at New Orleans, Dallas and Beaumont, Texas, will provide complete construction steel service to the Southern building and highway market.

Catalog Covers Industrial Protective Coatings

The Ceilcote Company has announced the publication of the new 8-page illustrated catalog No. C-150, entitled "Protective Coatings by Ceilcote." Its purpose is to simplify the complex problem of selecting the correct protective coating for industrial installations. Because Ceilcote recognizes the fact that no single coating provides

CARBIDE NAIL TOOLING
for
Glader—National-Wikschtrom
Nail Machines
PITTSBURGH CARBIDE DIE CO.
Monongahela, Penna. Ph 2033

SLEEPER & HARTLEY, Inc.
Designers and Builders
SPRING COILERS
WIRE WORKING MACHINERY
WIRE MILL EQUIPMENT
SPECIAL MACHINERY
Address Inquiries to
Box 1249
WORCESTER, MASS.

CHEMSTEEL CONSTRUCTION COMPANY, INC.
205 Chemsteel Bldg., Walnut St., Pittsburgh 32, Pa.
Send data on Engineering & Construction facilities for
ACID-ALKALI-PROOF CONSTRUCTION
of pickling and other tanks; flooring.
(TEAR OUT & MAIL WITH LETTERHEAD)

WOOD REELS and SPOOLS
American Woodworking Company
1" to 60" Diameters. Send for our free catalogue of all wood products made in the U. S. A.
1674 N. Lowell Avenue
Chicago 39, Illinois

To prolong the wear and life of ROPE it pays to specify MADESCO BLOCKS
MADESCO
TACKLE BLOCK CO., EASTON, PA.

WOOD & PLYWOOD REELS
for WIRE ROPE and
INSULATED WIRE & CABLE
THE NELSON COMPANY
Standard Oil Bldg., Baltimore 2, Md.

NEBUTT
MACHINERY FOR HIGH SPEED PRODUCTION
BRAIDERS TAKE-UPS STRANDERS
CABLERS BUNCHERS TAPING MACHINES
NEW ENGLAND BUTT COMPANY
304 Pearl Street Providence 7, R. I.
James Day (Machinery) Ltd.
28 Maddox Street, London W1, England

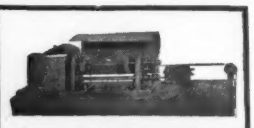
TRAUWOOD
Patenting, Annealing, Tempering, Galvanizing, and Tinning equipment for wire.
TRAUWOOD ENGINEERING CO.
Cleveland, Ohio

SURFACE COMBUSTION TOLEDO 1, OHIO
Surface
HEAT TREATING EQUIPMENT

CREPED PAPER
COIL OR BAR WRAPS
NATIONAL WATERPROOF PAPERS, INC.
CAMDEN 1, N. J.

NEP · SUMFOAM
ACID INHIBITOR • PICKLING COMPOUND
THE PARKIN CHEMICAL CO.
HIGHLAND BLDG. PITTSBURGH 6, PA.

"PARALAN"
Rust Preventatives
Lubricants
AMERICAN LANOLIN CORP.
Lawrence, Mass.

MODEL T-3
TORSION TESTER FOR WIRE

SCOTT TESTERS INC. 55 BLACKSTONE ST. PROVIDENCE 1, R.I.

ZINC WIRE
THE PLATT BROS. & CO.
Waterbury 20, CONN.

WIRE DRAWING MACHINERY AND EQUIPMENT
Rod Frames — 16" Frames, 8" Frames — Take-Up Frame, Wire — Pointers — Puller Tongs — General and heat resisting alloy castings for wire mill use.
Circulars on Request
E. J. SCUDDER FOUNDRY & MACHINE CO.
TRENTON, N. J.

WORLD'S LARGEST MANUFACTURER
SPIRAL WRAPPING MACHINES
For Coils or Straight Lengths
Terkelsen Machine Company
323 A Street, Boston 10

Immediately Available
WIRE WORKING MACHINERY
FOURSLIDES: Baird, Nilson & Manville, Nos. 0, 1, 2, 3, 4, 5, 3-20, 4-26
U. S. Tool Co. No. 22, 28, & 33 Multislides
Sleeper & Hartley Spring Coilers Nos. 0, 1, 2, 3, 3½, 4, & 5
Vaughn Nos. 8, 10, & 12 Moto-Blocs
Waterbury No. 3 Bull Blocks, Duplex
Morgan 4 stand Wire Drawer with pointer and 100 H.P. motor drive & motor
Waterbury Nos. 1, 2, & 3 Continuous Wire Drawing Machines
PARTIAL STOCK LISTING
"The most diversified stock of machinery in the country. If it's machinery we have it."
National Machinery Exchange
130 Mott St., New York 13, N. Y.
CAnal 6-2470

maximum protection in every application, it offers a complete line for a wide range of service conditions. Complete data on nine different coatings are presented to assist the user in the selection of the one best suited to any individual application.

★ ★ ★

Information given on each coating includes base formulation, temperature resistance, abrasion resistance, chemical properties, adhesion, method of application, surface preparation, colors, etc. In addition, applications are discussed in detail, and important limitations are noted.

★ ★ ★

A special feature of Catalog No. C-150 is the Protective Coating Properties Chart which presents complete information on each coating in concise form. In addition to formulation, temperature resistance, drying time, coverage, etc., the ability of each coating to resist eighteen commonly encountered chemicals is indicated. The outstanding properties of six frequently used primers are presented also.

★ ★ ★

Catalog No. C-150 will be sent upon receipt of letterhead request or publication inquiry. Write the company at 4846 Ridge Rd., Cleveland, Ohio.

Roebling Producing Cable With New Sheath

Charles R. Tyson, Executive Vice President, **John A. Roebling's Sons Corporation,** announced recently that the company is now in full commercial production of tellurium alloy lead sheath cable.

★ ★ ★

The company has been preparing for this production since the turn of the year and, after experimental runs, is now producing solid type impregnated paper-lead power cable with tellurium alloy lead sheath in large, commercial quantities.

★ ★ ★

This type of sheath was developed by the **General Electric Company** and is manufactured by Roebling under license from them. Several lengths of tellurium alloy lead sheathed cable are now being tested by utility companies and nearly 150,000 feet of cable were recently sold for actual operational purposes.

★ ★ ★

Cable sheaths made of this alloy show that it possesses stabilized bending and creep resistant properties of superior quality. Extrusion in the Roebling factory has shown that ease of control of the new alloy is one of its desirable characteristics. It is extruded on a standard lead press and allows a wide range of heat treatments.

★ ★ ★

At joint end wipes and other locations, applications of heat does not destroy its desirable characteristics.

Packard Electric to Have New Rod Mill

The General Motors Corporation will begin construction of its huge new plant just north of Warren some time this month and the plant probably will be ready for operation by early next year, it has been announced.

★ ★ ★

The new plant will house **Packard Electric** division's copper rod mill. It is the largest single expansion in the Packard division's history.

★ ★ ★

The cost was not disclosed but it is estimated unofficially that it will run between $1,500,000 and $2,000,000.

★ ★ ★

The new structure will include about 225,000 square feet of floor space and will be a one-story structure of brick, aluminum and glass. About 800 employes will be needed to man it although many will be moved from the Dana St. Cable plant for it.

★ ★ ★

It was indicated that the plant will have facilities for producing rod, expanded wire drawing and magnet wire facilities; nylon insulating, plastic insulating and extrusion facilities.

X-Ray Equipment to be Exhibited at Metals Show

The Research & Control Instruments Division, North American Philips Company, Inc., 750 South Fulton Avenue, Mount Vernon, N. Y., will occupy booth 1740 at the National Metals Show, International Amphitheatre, Chicago, November 1-5.

★ ★ ★

On display will be Norelco X-ray Analysis Equipment including the Wide-Range Diffractometer, 90-degree Diffractometer, Spectrograph and Wide-Range Goniometer with Powder Cameras and Accessories. There will be a complete line of Norelco radiographic equipment including the MG 60, MG 160 and MG 150/300 units.

★ ★ ★

The new light-weight Portaflux unit which is small enough to go into a man-hole for magnetic-particle tests will also be shown. In addition, Philips will exhibit the new EM-75 Electron Microscope along with the standard EM-100 Electron Microscope.

★ ★ ★

In attendance at the Philips booth will be **E. F. Champaygne, P. I. Wolf** and **A. Gobus** who will explain and demonstrate the proper use of the various types of equipment.

IDA Elects Officers

At its ninth convention in Atlantic City in May, The Industrial Diamond Association of America seated officers and directors for the coming year.

★ ★ ★

A new president and second vice president and four new directors were elected. The officers now are: President, **Walter J. Meinhardt, Meinhardt Diamond Tool Co.,** Chicago; 1st Vice President, **Piet Smit** of **J. K. Smit & Sons, Inc.,** Murray Hill, N. J.; 2nd Vice President, **Jan Taeyaerts, Precision Diamond Tool Co.,** Elgin, Ill., and **Athos D. Leveridge,** Secretary-Treasurer (Executive Manager).

★ ★ ★

The Directors are: **I. R. Berk, Mid-West Diamond Service,** Chicago; **W. L. Huber, Diamond Tool Research Co.,** New York City; **F. E. Koebel, The Van Itallie Corp.,** New York City; **W. F. Mullins, Mullins Industrial Diamond Corp.,** New York City; **D. Reider, Ajax Industrial Supplies, Inc.,** Fort Wayne; **H. E. Robison, Wheel Trueing Tool Co.,** Detroit; **E. L. C. Tappin, Superior Abrasive Labs., Inc.,** Yonkers, N. Y., and **M. Winston, Diamond Drill Carbon Co.,** New York City.

Engineering and Professional Services

LANCASTER, ALLWINE & ROMMEL
REGISTERED PATENT ATTORNEYS
Suite 438, 815—15th St., N. W.
Washington 5, D. C.
●
Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request.

WALLACE G. IMHOFF CO.
CONSULTANTS IN
ZINC COATINGS
11983 Woodbine St.
LOS ANGELES 34 • CALIFORNIA

CONSULTING WIRE MILL ENGINEER
Specializing in Wire Mill Machinery, Plant Layout and Production Techniques.
CLARENCE S. ARMS
Sleeper & Hartley, Incorporated
P.O. Box 1249 • Worcester, Mass.

FOR SALE
2 Waterbury Farrel Straight Roll Wire Drawing Machines
1 Waterbury Farrel Spooler
Reply to Box 762
WIRE AND WIRE PRODUCTS

SALESMAN WANTED
Established wire manufacturer of Round and Flat High Carbon Specialty Wire for New England Territory. Please give detailed information stating qualifications which will be held confidential. Reply Box No. 760.
WIRE AND WIRE PRODUCTS
453 Main Street Stamford, Conn.

CHEMIST WANTED
For product development and evaluation including technical service responsibilities. Position open with chemical manufacturer interested in developing and selling products to wire and tube drawing industries. Eastern location. Submit resume with salary requirements.
Box 758
WIRE AND WIRE PRODUCTS

FINE WIRE FOREMAN
Fine opportunity to take full charge of low carbon fine wire drawing—annealing—tinning—galvanizing, old medium sized well established Midwestern Company.
Box 735
WIRE & WIRE PRODUCTS
453 Main St., Stamford, Conn.

SUPERINTENDENT
Midwestern mill has opening for Superintendent with metallurgical and practical operation background. Experience on all finishes of wire required with emphasis on hot dip galvanizing. Please include complete resume of work experience. Write Box 700.

FOR SALE
AT LARGE DISCOUNT

Type	Size	Quantity Pounds
C-1008 Industrial Quality Lime Bright Annealed Dead Soft Basic Wire (Paper Wrapped Coils)	.072	14,319
Bethanized Type 2 Soft Temper Low Carbon Basic Wire	.102	13,080
Improved Plow — (Paper Wrapped Coils)	.032	1,649
	.040	3,332
	.042	1,150
	.044	5,628
Galv. Plow on Spools	.018	1,000

For Information contact Mr. Reif
Spencer Wire Corporation
555 Lehigh Avenue
Union, New Jersey
Unionville 2-7950

Index to Advertisers

A

Academy Metal Products Co., Inc. 879
Acrometal Products, Inc. 885
Aetna-Standard Eng'g Co. 903
Ajax Industrial Supplies, Inc. 921
Alloy Metal Wire Division, H. K. Porter Co., Inc. 831
American Chemical Paint Company 875
American Insulating Machinery Company 888
American Lanolin Corp. 922
American Woodworking Co. 921
Apco Mossberg Co. 902
Arcola Wire Co. 913
Arms, Clarence S. 923

B

Baird Machine Co., The 829
Balloffet-Vianney Wire Die Co., Inc. 919
Boulin, Victor J., Inc. 920
Boyd & Sons Mfg. Corp. 904
Bridge Mfg. Co. 810

C

Camden Wire Co., Inc. 882
Carboloy Dept. of General Electric ..... 868 and 869
Carl-Mayer Corp., The 903
Cedar West Tool Co., Inc. 908
Chase Brass & Copper Co. 811
Chemsteel Construction Co., Inc. 921
Cleveland Tramrail Division of The Cleveland Crane & Engineering Co. 827
Cochaud Wire Die Inc. 920
Continental Can Company 856
Continental Steel Corporation 915
Cook Mfg. Co. 886
Cosa Corporation 824
Coulter & McKenzie Machine Co., Inc., The 823
Crucible Steel Company of America 826

D

Danforth Co., C. W., The 904
Davis Electric Company 816
Drever Company 821
Durant Mfg. Co. 910
Durkee Mfg. Co. 913
Dykrex Corporation of America—Roos Tool & Mfg. Div. 911

E

Eastern Carbide Corp. 920
Eisler Engineering Co., Inc. 916
Electric Furnace Company, The ..... Back Cover
Electronic Rubber Co. 905
Elgin National Watch Co., Abrasives Div. 835
Emory, Robert J. Company 907
Engis Equipment Co. ..... 825 and 887

F

Fidelity Machine Co., Inc. 882
Firth Sterling, Inc. 809
Fisher Associates ..... 916 and 919
Fort Wayne Wire Die, Inc. 920

G

Gantois 915
Glader, Wm. Machine Works 881
Glass Fibers, Inc. 818

H

Haskell-Dawes Machine Co., Inc. 911
Haveg Corporation 916
Heany Industrial Ceramics Corp. 919
Heineman Oscar, Corp. 918
Herborn 836
Hoffman Co., Inc., Robert W. 915
Hubbard Spool Company 833

I

Imhoff, Wallace G., Co. 923
Indiana Wire Die Company 921
International Wire Products Corp. 901

J

Johnson Steel & Wire Co., Inc. 877

K

Kaiser Aluminum & Chemical Sales, Inc. 822
Kay & Warren Co. 906
Kelly Wire Die Corporation 920
Keystone Steel & Wire Company 878
Kilmer, M. D. & Co. 919

L

Lancaster, Allwine & Rommel 923
Lewis Machine Company, The 884
Libbey Owens, Ford Glass Co., Fiber Glass Div. 830
Lund Products Div., Artos Sales Co. 905

M

Madesco Tackle Block Co. 921
Malin & Company, The 913
Mason Can Company 917
McCaskie, Wm., Inc. 917
Merrimac Paper Co., Inc. 895
Metal Carbides Corporation 838
Metal and Thermit Corporation 902
Mettler Machine Tool, Inc. 917
Michigan Oven Co. 834
Micro Products Company 874
Miller, R. H. Co., Inc. 842
Milton Machine Works, Inc. 915
Molina Industrial Diamond Co., Inc. 921
Montgomery Co., The 914
Morgan Construction Company ..... Front Cover
Mossberg Pressed Steel Corp. 900

N

National Gypsum Co. 848-B
National Machinery Exchange 922
National Research Co. 918
National Waterproof Papers, Inc. 922
Nelson Company, The 921
New England Butt Company 921
New England Lacquer Co. 912
New England Wire Die Co. 921
New York Engineering Co. 876
Nilson Machine Co., The, A. H. 889
Nopco Chemical Co. 883
Nord International Corp. 888
North American Philips Co., Inc. 920
Norton Company 896

P

Pacific Coast Borax Company 910
Parkin Chemical Co., The 922
Parkway-Kew Corp. 909
Peschel Electronics, Inc. 907
Pittsburgh Carbide Die Co. 921
Platt Brothers & Co., The 922
Porter, H. K. Inc. 916
Pourtier Freres, Ets. 894

R

Republic Steel Corp., Pressed Steel Div. 813
Rockwell, W. S. Co. 899
Roebling's John A. Sons, Corp. 848A
Roll-a-Reel 917
Royle, John & Sons 898
Rusch Wire Die Corporation 920

S

Schumag Schumacher Metallwerke 828
Scott Testers, Inc. 922
Scovill Manufacturing Co. 891
Scudder, E. J. Foundry & Machine Co. 922
Seybold Transworld Exporters 912
Sheffield Steel Corp. 906
Shell Oil Company 814
Sjogren Tool and Machine Co., Inc. 909
Sleeper & Hartley, Inc. 921
Spencer Wire Corp. 908
Standard Industrial Compounds Co., Inc. 837
Standard Mill Supply Co. 890
Steel Equipment Co. 892
Surface Combustion Corp. 921
Syncro Machine Company 812

T

Terkelsen Machine Co. 922
Trauwood Engineering Co. 921

U

Universal Wire Die Co. 921
Utica Drop Forge and Tool Corp. 839

V

Vascoloy-Ramet Corporation 840
Vaughn Machinery Company, The 819

W

Wafios 892
Wardwell Braiding Machine Co. 880
Warner Company 918
Waterbury Farrel Foundry & Machine Co. 817
Watson Machine Company, The ..... Inside Back Cover
Wayne Wire Die Co. 921
Wean Equipment Corporation 851
Wells, Frank L. Co. 897
Wickwire Bros. Inc. 914
Willey's Carbide Tool Co. 893
Wilson, Lee Engineering Co., Inc. ..... Inside Front Cover
Wire Insulating Mach'y Inc., Div. of Machinery Electrific, Inc. .. 894
Wire & Textile Machinery, Inc. 914
Wire Tool Div., Bridgeport Jig Boring Co. 914

Y

Youngstown Sheet & Tube Company, The 815
Youngstown Welding & Eng'g Co. 832

WHERE TO BUY

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.
Only advertisers who have contracted for six or more insertions are listed in this section.

ABRASIVES—
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Norton Co., Worcester, Mass.

ACID INHIBITORS—
(See Inhibitors, Pickling)

ACID-PROOF CONSTRUCTION—
Ceilcote Company, Cleveland, Ohio
Chemical Construction Co., Pittsburgh, Pa.
Haveg Corporation, Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

ALLOYS—Hardsurfacing Capstans, etc.
Parkway-Kew Corp., Menlo Park, N. J.

ANNEALING MACHINES — Electric Resistance
Synero Machine Co., Perth Amboy, N. J.
Trauwood Engr. Co., Cleveland, O.

ANNEALING POTS AND BOXES—
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

BAKERS—
(See OVENS—Rod Bakers)

BOBBINS—Braider & Wire Weaving
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

BORAX—Wire Drawing
Pacific Coast Borax Co., New York, N. Y.

BORON CARBIDE—
Norton Co., Worcester, Mass.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

CEMENTS—Acid Proof
Ceilcote Company, Cleveland, Ohio

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Metal & Thermit Corp., New York, N. Y.
Parkin Chemical Co., The, Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago.

CLEANING & PICKLING EQUIP.—
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, O.
Haveg Corporation, Newark, Del.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio
Youngstown Welding & Eng'g Co., Youngstown, Ohio.

CLOTH—WIRE, All Metals
Chase Brass & Copper Co., Waterbury, Conn.
Gantois, Saint Die (Vosges), France.
Wickwire Bros., Cortland, N. Y.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y
Standard Industrial Compounds Co., Chicago

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.
Miller, R. H. Co., Inc., Homer, N. Y.

COMPOUNDS—Diamond (Pre-Mixed)
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago.
United States Industrial Diamond Corp., New York, N. Y.

COMPOUNDS—Extrusion, for Wire
(See COMPOUNDS—Vinyl)

COMPOUNDS—For Improving Drawing and Extrusion
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Metal & Thermit Corp., New York, N. Y.

COMPOUNDS—Phosphate Coating
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corporation, Lawrence, Mass.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Standard Industrial Compounds Co., Chicago.

COMPOUNDS—Vinyl, for Wire
Electronic Rubber Co., Stamford, Conn.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Cook's Sons, Inc., Adam, Linden, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Pacific Coast Borax Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago.
Swift & Company, Chicago, Ill.

CONDUCTORS—Flexible, Electrical
Montgomery Co., The, Windsor Locks, Conn.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Utica Drop Forge & Tool Corp., Utica, N. Y.
Vascoloy-Ramet Corp., Waukegan, Ill.
Willey's Carbide Tool Co., Detroit, Mich.

CUTTING TOOLS—Wire
Porter, H. K. Inc., Somerville, Mass.

DESCALING PROCESS—Sodium Hydride
du Pont de Nemours & Co., Inc., E. I., Wilmington, Del.
Fisher Associates, New York, N. Y.

DIAMONDS—Industrial
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Molina Industrial Diamond Co., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
United States Industrial Diamond Corp., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS—
Danforth, The C. W. Co., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Industrial Diamond Powders, Pittsburgh, Pa.
Molina Industrial Diamond Co., New York, N. Y.
National Research Company, St. Clair Shores, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
United States Industrial Diamond Corp., New York, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDER RECLAIMING—
Danforth, The C. W. Co., Youngstown, Ohio
Industrial Diamond Powders, Pittsburgh, Pa.
Kay & Warren Co., Brooklyn, N. Y.
National Research Co., St. Clair Shores, Mich.
Molina Industrial Diamond Co., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Nord International Corp., Orange, N. J.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Carbide, Tungsten & Tantalum
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Vascoloy-Ramet Corp., Waukegan, Ill.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Cold Heading
Carboloy Dept. of General Electric Co., Detroit
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Vascoloy-Ramet Corp., Waukegan, Ill.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Cochaud Wire Die Inc., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Molina Industrial Diamond Co., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., Elmet Div., Lewiston, Me.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIES—Extrusion
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelly Wire Die Corp., New York, N. Y.

DIES—Nail, Nail Cutters, Feeder Blocks, Grippers, etc.
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc, New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit.
Cochaud Wire Die Inc., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Ft. Wayne Wire Die., Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., Elmet Div., Lewiston, Me.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Vascoloy-Ramet Corp., Waukegan, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Special Shapes, Etc.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Swaging
Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y
Vascoloy-Ramet Corp., Waukegan, Ill.
Willey's Carbide Tool Co., Detroit, Mich.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRUMS & TRAVERSES—For Cable Reels
Hubbard Spool Co., Garrett, Ind.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

DRYING EQUIPMENT
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio.
Michigan Oven Co., Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.

ENGINEERS—Consulting
Lubricants—Hans C. Bick, Inc., Reading, Pa.
Wire Mill—Clarence S. Arms, Worcester, Mass.
Zinc—Imhoff, Wallace G. Co., Los Angeles, Calif.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCING & FENCES—Wire
Interlocking Fence Co., Morton, Ill.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio
Harper Electric Furnace Corp., Buffalo, N. Y.
Lepel High Frequency Laboratories, Inc., New York, N. Y.
Rockwell, W. S. Co., Fairfield, Conn.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engineering Co., The, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Drever Company, Phila., Pa.
Lepel High Frequency Laboratories, Inc., N. Y., N. Y.
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Induction
Lepel High Frequency Laboratories, Inc., New York, N. Y.

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio

FURNACES—Pot (oil, gas, electric)
Ajax Electric Co., Inc., Philadelphia, Pa.

FURNACES—Resistance Heating, Strand
(See Annealing Machines)

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio

GALVANIZING EQUIPMENT — (See MACHINERY—Galvanizing Wire)

GRINDERS—Roll
Norton Co., The, Worchester, Mass.

GUIDES—For Wire
Heany Industrial Ceramic Corp., New Haven, Conn.

GUIDE TIPS—For Extruding Machines (See NOZZLES)

HAMMERS—Nail Heading
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HARDSURFACING ALLOYS—
(See Alloys—Hardsurfacing)

HOOKS—Pickling & Liming
Youngstown Welding & Eng'g' Co., Youngstown, Ohio

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INSULATING MATERIALS—
Electronic Rubber Co., Stamford, Conn.
Glass Fibers, Inc., Toledo, Ohio
Heineman Corp., Oscar, Chicago, Ill.
Libbey-Owens, Ford Glass Co., Fiber Glass Div., Toledo, Ohio
Merrimac Paper Co., New York, N. Y.
New England Lacquer Co., E. Providence, R. I.

INSULATING MATERIALS — Paper—For Electric Wire Cable
Merrimac Paper Co., New York, N. Y.

LACQUERING SYSTEMS — See MACH.—Lacquering Electric Wire

LACQUERS—For Electric Wire
New England Lacquer Co., E. Providence, R. I.

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., The, Philadelphia and Bellefonte, Pa.

LUBRICANTS — For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire, Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Wm., Machine Works, Chicago, Ill.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Braiding
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Wardwell Braiding Mach. Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Haskell-Dawes Machine Co. Philadelphia, Pa.
New England Butt Co., Providence, R. I.
New York Engineering Co., Yonkers, N. Y.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Machinery—Winding Wire)

MACHINERY—Centerless Grinding
Schumag Schumacher Metallwerke, Aachen, Germany.

MACHINERY—Chain Making
Cosa Corporation, New York, N. Y.
Nilson, A. H. Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Closing Rope
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh.
American Insulating Mach'y Co., Phila., Pa.
National Mach'y Exch. (Used), New York.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Crimping Wire
Cedar West Tool Co., New York, N. Y.

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Utica Drop Forge & Tool Corp., Utica, N. Y.
Wean Equipment Corp., Cleveland, Ohio
Wells, Frank L., Co., Kenosha, Wis.

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.
Herborn, Herborn, Germany.

MACHINERY—Diameter Testing Continuous
Standard Electronic Research Corp., New York, N. Y.

MACHINERY—Die Making
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. General Electric Co., Detroit, Mich.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Firth Sterling, Inc., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Nord International Corp., Orange, N. J.
Wayne Wire Die Co., Hillside, N. J.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Electrode Grinding
Cosa Corporation, New York, N. Y.

MACHINERY—Edging (See MACHINERY — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.
Rockwell Co., W. S., Fairfield, Conn.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Extruding
Aetna-Standard Engineering Co., Pittsburgh.
Davis-Standard Sales Corp., Mystic, Conn.
Royle, John, & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Mettler Machine Tool, Inc., New Haven, Conn.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Forming Wire
Baird Machine Co., Stratford, Conn.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Fourdrinier Looms
Cedar West Tool Co., New York, N. Y.

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis-Standard Sales Corp., Mystic, Conn.
Ets. Pourtier Frères, Romainville, France
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Mach. Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia.
Cook Mfg. Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, O.
Michigan Oven Co., Detroit, Mich.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Cedar West Tool Co., New York, N. Y.
Interlocking Fence Co., Morton, Ill.
Mummert-Dixon Co., Hanover, Pa.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Baird Machine Co., The Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g Co., Youngstown, Ohio.

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.
Cosa Corporation, New York, N. Y.

MACHINERY—Pointing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Poultry Wire Fencing
Interlocking Fence Co., Morton, Ill.
Wean Equipment Corp., Cleveland, O.

MACHINERY—Re-Spooling
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Cedar West Tool Co., New York, N. Y.
Davis Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Mummert-Dixon Co., Hanover, Pa.
National Mach'y Exch. (Used), New York, N. Y.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Schumag Schumacher Metallwerke, Aachen, Germany
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Rolling Mill
Morgan Construction Co.. Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Insulating
Davis-Standard Sales Corp., Mystic, Conn.
Royle, John & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Peschel Electronics, Inc., New Rochelle, N. Y.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spring Making
Carlson Company, The, New York, N. Y.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt, Germany.

MACHINERY—Straightening & Cutting
Cosa Corporation, New York, N. Y.
Kilmer, M. D., & Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Medart Co., The, St. Louis, Mo.
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Studmaking
Cosa Corporation, New York, N. Y.

MACHINERY—Swaging
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Sales Corp., Mystic, Conn.
Ets. Pourtier Frères, Romainville, France
Federal Manufacturing Co., Wallingford, Conn.
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.
New York Engineering Co., Yonkers, N. Y.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Testing Magnet Wire Coatings for Pin Holes
Peschel Electronics, Inc., New Rochelle, N. Y.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.
Spring Mfgs. Supply Co., Plantsville, Conn.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Michigan Oven Co., Detroit, Mich.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—for Wire Welding
(See WELDERS—Butt and Spot)

MACHINERY—Washer Form'ng
Cosa Corporation, New York, N. Y.

MACHINERY—Winding Wire
Cedar West Tool Co., New York, N. Y.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Newark, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Michigan Oven Co., Detroit, Mich.
Mummert-Dixon Co., Hanover, Pa.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Herborn, Herborn, Germany
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Schumag Schumacher Metallwerke, Aachen, Germany
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.
Woodside Wire Corp., Wortendyke, N. J.

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn.
Cosa Corporation, New York, N. Y.
Kilmer, M. D., & Co., Cleveland, Ohio
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Wean Equipment Co., Cleveland, Ohio

NAIL TOOLING—Tungsten Carbide
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Brothers, Inc., Cortland, N. Y.

NOZZLES—For Extruding Machines
Wire Tool Div., Bridgeport Jig Boring Co., Bridgeport, Conn.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.
Rockwell Co., W. S., Fairfield, Conn.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAPER—Creped Wrapping
National Waterproof Papers, Inc., Camden, N. J.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
National Waterproof Papers, Inc., Camden, N. J.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—
(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS
(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Youngstown Welding & Eng'g Co., Youngstown, Ohio

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

PLASTICS—for Wire Insulation
Electronic Rubber Co., Stamford, Conn.

PLIERS—For Wire
Utica Drop Forge & Tool Corp., Utica, N. Y.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

PRESSES—Hydraulic and Mechanical
Aetna-Standard Engineering Co., Pittsburgh, Pa.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wean Equipment Corp., Cleveland, Ohio

REEL AND TENSION STANDS—
Davis Electric Co., Wallingford, Conn.
Fidelity Machine Company, Inc., Philadelphia
Industrial Ovens, Inc., Cleveland, Ohio.
Kilmer, M. D., & Co., Cleveland, Ohio
Moslo Machinery Co., Cleveland, Ohio
New York Engineering Co., Yonkers, N. Y.
Roll-A-Reel, Cincinnati, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

REEL CRUTCHES—
Roll-A-Reel, Cincinnati, Ohio
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Co., Garrett, Ind.
Milton Machine Works, Inc., Milton, Pa.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Garrett, Ind.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Metal Bound
Durkee Mfg. Co., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., Wm., Westport, Mass.

REELS—Plywood
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., Wm., Westport, Mass.
Nelson Company, The, Baltimore, Md.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L. Mfg. Co., Rockford, Ill.
Hubbard Spool Co., Garrett, Ind.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
Mason Can Company, East Providence, R. I.
McCaskie, Inc., Wm., Westport, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Milton Machine Works, Inc., Milton, Pa.
Moslo Machinery Co., Cleveland, Ohio
Mossberg Pressed Steel Corp., Attleboro, Mass.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS & SPOOLS—Wooden
American Woodworking Co., Chicago, Ill.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.
Hubbard Spool Co., Garre't, Ind.
Nelson Company, The, Baltimore, Md.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—
(See OVENS—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Crucible Steel Co. of America, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Steel
Crucible Steel Co. of America, Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
Chase Brass & Copper Co., Waterbury, Conn.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Platt Bros. & Co., The, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Sheffield Steel Corp., Kansas City, Mo.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Blocks
Madesco Tackle Block Co., Easton, Pa.

ROPE—Wire
American Steel & Wire Company, Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See COMPOUNDS—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See COMPOUNDS—Rust Preventing)

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
New York Engineering Co., Yonkers, N. Y.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

SOAPS—Industrial and Wire Drawing
(See COMPOUNDS—Wire Drawing)

SODIUM—for Descaling
du Pont de Nemours & Co., Inc., E. I., Wilmington, Del.

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Roebling's, John A. Sons Corp., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

STRIPPERS—Wire, Electric
Utica Drop Forge & Tool Corp., Utica, N. Y.

TANKS—Compound
New York Engineering Co., Yonkers, N. Y.
Watson Machine Co., Paterson, N. J.

TANKS—Pickling and Plating
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.

TESTERS — INSULATION
(See MACHINERY—Spark Testers)

TESTING EQUIPMENT
(See MACHINERY Testing, Physical and Diameter Testing)

TINNING PROCESS—
Metal & Thermit Corp., New York, N. Y.

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper, Silver and False Gold Coated, etc.
(See TINSEL—Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

TOOLS—Welding Wire, Strip & Foil (Pressure)
Utica Drop Forge & Tool Corp., Utica, N. Y.

TOOLS—Wire Cutting
Porter, H. K. Inc., Somerville, Mass.
Utica Drop Forge & Tool Corp., Utica, N. Y.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Machy—Power Transmission)

TRAVERSES & DRUMS—For Reels
Drums & Traverses (See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

TUBE BENDERS AND FORMERS—
Kilmer, M. D., & Co., Cleveland, Ohio

VALVES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—for Electric Wire
N. E. Lacquer Co., E. Providence, R. I.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Northboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Hoffman Co., Robt. W., Chicago, Ill.
Micro Products Co., Chicago, Ill.
Utica Drop Forge & Tool Corp., Utica, N. Y.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Malin & Co., The, Cleveland, Ohio
Scovill Mfg. Co., Waterbury, Conn.
Seneca Wire & Manufacturing Co., Fostoria, O.

WIRE—Barbed
Interlocking Fence Co., Morton, Ill.

WIRE—Brass
Chase Brass & Copper Co., Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—Brush
Spencer Wire Corp., Union, N. J.

WIRE—Bunched & Stranded, Copper
Camden Wire Co., Camden, N. Y.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Camden Wire Co., Camden, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind
Crucible Steel Co. of America, Pittsburgh, Pa.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Scovill Mfg. Co., Waterbury, Conn.
Seneca Wire & Manufacturing Co., Fostoria, O.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
Chase Brass & Copper Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—For Electrical Conductors
Camden Wire Co., Camden, N. Y.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.

WIRE—Flat, Fine
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Galvanized
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Roebling's, John A. Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Worcester, Mass.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Keystone Steel & Wire Co., Peoria, Ill.
National Lock Washer Company, The, Newark, N. J.
North American Philips Co., Inc., Elmet Division, Lewiston, Me.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Scovill Mfg. Co., Waterbury, Conn.
Seneca Wire & Manufacturing Co., Fostoria, O.
Sheffield Steel Corp., Kansas City, Mo.
Spencer Wire Corp., Union, N. J.
U. S. Steel Co., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Steel & Wire Co., Cleveland, Ohio
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., The, Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, O.
Spencer Wire Corp., Union, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Alloy Metal Wire Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Malin & Co., The, Cleveland, Ohio

WIRE—Oil Tempered
Crucible Steel Co. of America, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.

WIRE—Silver Plated Copper
Camden Wire Co., Camden, N. Y.

WIRE—Special Shapes
Alloy Metal Wire Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Crucible Steel Co. of America, Pittsburgh, Pa.
Continental Steel Corp., Kokomo, Ind.
National Lock Washer Company, The, Newark, N. J.

WIRE—Spring
Alloy Metal Wire Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Crucible Steel Co. of America, Pittsburgh, Pa.
Firth Sterling, Inc., Pittsburgh, Pa.
National Lock Washer Company, The, Newark, N. J.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Steel—Also Coppered and Galvanized Steel
Alloy Metal Wire Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Sheffield Steel Corp., Kansas City, Mo.
Spencer Wire Corp., Union, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O

WIRE—Straightening and Cutting
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Tinned Copper
Camden Wire Co., Camden, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., Elmet Division, Lewiston, Me.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WRAPPING PAPER—Creped
(See PAPER—Creped Wrapping)

YARNS & TAPES—Insulating
Glass Fibers, Inc., Toledo, Ohio
Heineman Corp., Oscar, Chicago, Ill.
Libbey-Owens-Ford Glass Co., Fiber Glass Div., Toledo, Ohio.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY
ESTABLISHED 1845
PATERSON 3, NEW JERSEY, U. S. A.

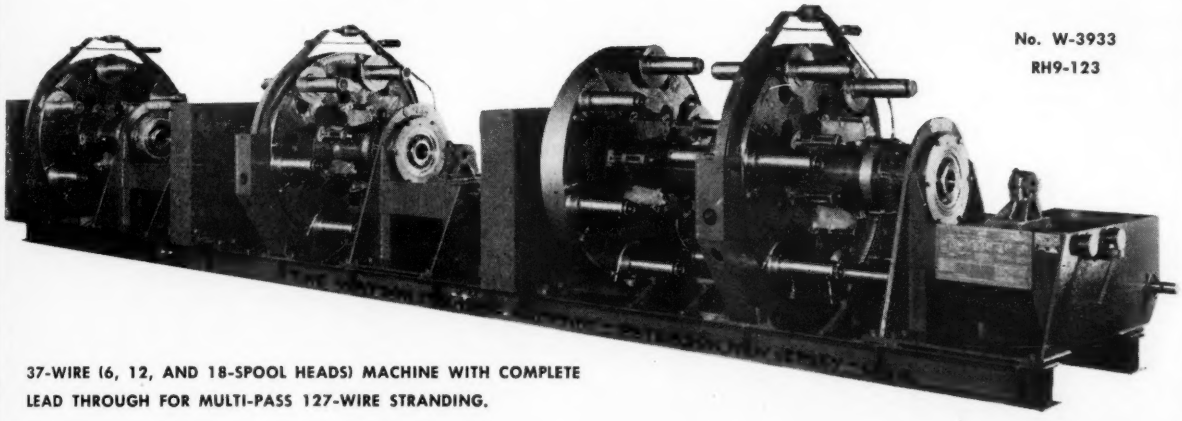
ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE
AND MASTICATING MACHINERY MANUFACTURERS

WATSON

STRANDING HEADS TYPE "RH9"

THIS RIGID FRAME HORIZONTAL DESIGN IS THE INDUSTRY'S PREFERRED MEDIUM FOR PRODUCING SOFT COPPER AND ALUMINUM MULTIPLE-LAYER CONCENTRIC STRAND OF ROUND OR SECTOR SHAPE.

THE RH9 HEADS CARRY STEEL SPOOLS 22" FLANGE DIAMETER x 11" TRAVERSE x 5" DIAMETER BORE, OF 650-POUND COPPER WIRE CAPACITY.



No. W-3933
RH9-123

37-WIRE (6, 12, AND 18-SPOOL HEADS) MACHINE WITH COMPLETE LEAD THROUGH FOR MULTI-PASS 127-WIRE STRANDING.

WHEN COMPARED WITH PLANETARY MACHINES OF SIMILAR UTILITY, THE FOLLOWING ADVANTAGES ARE NOTEWORTHY: MUCH LOWER INITIAL COST, LESS FLOOR AREA REQUIRED, CONSIDERABLY HIGHER SPEEDS, GREATLY REDUCED LOADING TIME, LESS POWER REQUIRED, FEWER OPERATORS REQUIRED, AND MAINTENANCE IS PRACTICALLY NIL.

OPEN DESIGN, WITH OVERHUNG SPINDLE MOUNT, ALLOWS UTMOST FREEDOM AND RAPIDITY OF LOADING AND THREADING. ALL STEEL AND BALL BEARING THROUGHOUT. FULLY ENCLOSED AND FORCE-FEED LUBRICATED DRIVE AND CHANGE GEARING. AUTOMATIC ELECTRIC STOPS FURNISHED. SPRING-SET AIR-RELEASED BRAKES.

ROLL-OVER EQUIPMENT ON HEADS FOR PRE-SPIRALED (PREFORMED) SECTOR STRANDS PROVIDED WHEN SPECIFIED.

COMPLETE LEAD-THROUGH FOR MULTI-PASS STRANDING AND TANDEM ARRANGEMENT INSTALLED WHEN REQUIRED.

THIS DESIGN IS ALSO AVAILABLE IN SMALLER SIZES AND GROUPING, WITH AUXILIARIES TO MEET ANY PRACTICAL RIGID FRAME STRANDING REQUIREMENT.

8-54

Typical EF Installations

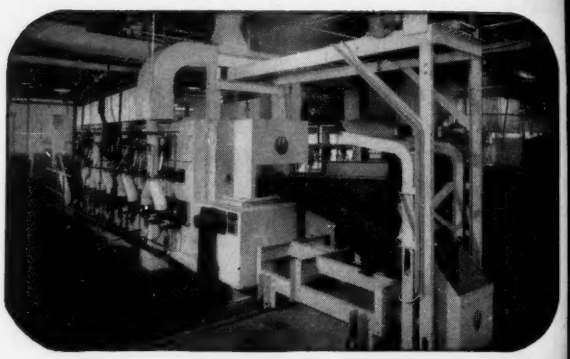
For the utmost in dependable, efficient, low cost service, specify an EF furnace. Built in roller hearth, roller rail, chain belt, car type, wire belt and many other designs. Complete with special atmosphere generators and material handling facilities. Gas fired, oil fired, or electrically heated for any heating or heat-treating operation — any process — any product — and any capacity requirement. Let the EF engineers, with their long and successful experience in engineering and building furnaces, work with you on your next heat treating job.

THE ELECTRIC FURNACE COMPANY

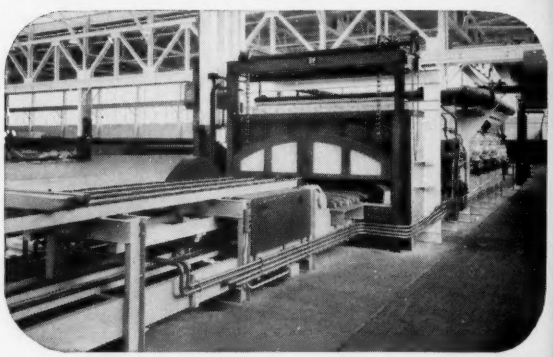
Gas Fired, Oil Fired and Electric Furnaces

Wilson Street, Salem, Ohio

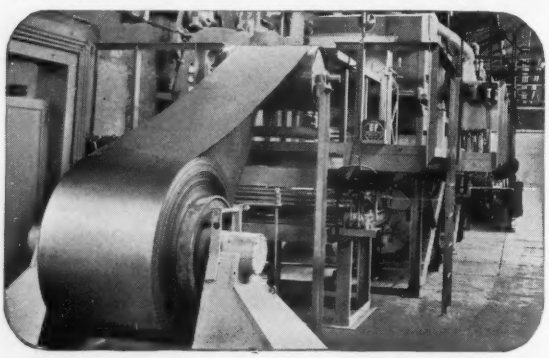
Canadian Associates • CANEFCO LIMITED • Toronto 1, Canada



Small parts, headed, drawn, forged or stamped are heat-treated without scale or decarburization—uniformly and economically—in EF chain belt furnaces. Capacities to meet any requirement.



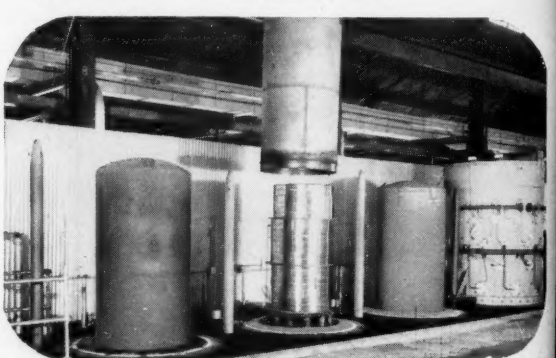
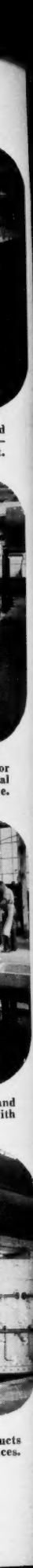
Bars and billets are scale-free heated for rolling, drawing or other processing in EF pusher, rotary and other types of special atmosphere furnaces. Any capacity, atmosphere or temperature.



Continuous Strip Lines for annealing, normalizing, galvanizing, aluminizing and for producing various surface and metallurgical conditions on ferrous and nonferrous strip.

Nickel-silver and other alloy wire and strip is clean and scale-free annealed in EF furnaces. Furnished complete with special atmosphere and desulphurizing units.

Ferrous and non-ferrous wire on reels, spools, coils and strands is bright annealed uniformly and continuously in EF special atmosphere furnaces. Capacities for any requirement.



Carbon, alloy and non-ferrous wire, strip and other products are annealed, carburized or nitrided in EF bell type furnaces. Cycles readily changed to suit the process.